Custom Ultrasonics System 83 Plus

Bio-Medical Engineering Manual

Custom Ultrasonics Inc.
144 Railroad Drive
Ivyland PA 18974

215-364-1477

Rev. Date 12-1-06

TABLE OF CONTENTS

INTRODUCTION 1

SYSTEM 83 PLUS™ (WASHER/DISINFECTOR) 1

WATER QUALITY, FILTRATION AND TEMPERATURE 1
DETERGENTS 2

MECHANICAL ACTION DURING THE SYSTEM 83 PLUS™ (WASHER/DISINFECTOR) CLEANING PHASE 3

TIME REQUIREMENTS FOR THE STANDARDIZED PROCESS 3
LIQUID CHEMICAL GERMICIDE ("LCD") 4
PROCESSING ACCESSORIES 4
ENDOSCOPE DRYING AND STORAGE 5

STANDARDIZED PROCESS SYSTEM 83 PLUS™ (WASHER/DISINFECTOR) 5

PHYSICAL DESCRIPTION OF SYSTEM 83 PLUS™ (WASHER/DISINFECTOR) 7

ELECTRICAL REQUIREMENTS 7
PLUMBING REQUIREMENTS 8
COMPUTER HARDWARE 8
INSTALLATION 9
IN-SERVICE TRAINING PROGRAM 9

ROUTINE MAINTENANCE PROCEDURE CHECK LIST 10

DISINFECTING DETERGENT LINE 12

INSTALLATION, DISINFECTION & REPLACEMENT PROCEDURES FOR THE WATER INLET FILTER ASSEMBLY & WATER INLET PLUMBING LINE(S) 14

STERILIZATION OF FILTER ASSEMBLY PROCEDURE 15
DISINFECTION OR STERILIZATION OF WATER INLET LINES PROCEDURE 16

SERVICE PROGRAM INSTRUCTIONS FOR CUSTOM ULTRASONICS PLUS PROGRAM 20

SYSTEM MAINTENANCE 21

PROBLEM SOLVING 23

COMPUTER INSTALLATION AND INSTRUCTIONS 27

PROCEDURE TO RECOVER FROM LOSS OF SETUP 28

PART NUMBERS 30

WIRING SCHEMATICS 40

Introduction

The field of Endoscopy has expanded to include every medical discipline, including the field of general surgery. As a result of the development of new diagnostic and treatment techniques, the flexible endoscope has become sophisticated and intricate in design. To provide a flexible endoscope that is safe for reuse, the requirements for reprocessing the endoscope must be understood.

The flexible endoscope is comprised of an insertion tube with internal channels, an umbilical cord with channels that attach to a power source, and a control head by which the distal tip of the insertion tube can be manipulated. Depending on the intended use, the endoscope may contain one or more internal channels including, but not limited to, an air/water channel, a suction/biopsy channel, a lifting channel "ERCP", a water jet channel, auxiliary water and a CO^2 channel.

Knowing the endoscope manufacturer's requirements for processing a flexible endoscope is equally important to understanding the synergism of all components used for decontaminating the flexible endoscope so it is "safe for patient use". The quality of the water, temperature, detergent and germicide; followed by the number of rinses, and drying of the endoscope all impact the outcome.

The Endoscopy department must establish acceptable standardized reprocessing procedures for decontaminating flexible endoscopes following the patient procedure and prior to reuse. Before processing flexible endoscopes, we recommend you review the processing guidelines published by **SGNA, APIC, and ASGE**.

System 83 Plus (washer/disinfector)

Water Quality, Filtration and Temperature:

Across the nation, the quality of water (its content of sediment and waterborne microorganisms) varies and can affect the plumbing lines, mechanical components of **System 83 Plus™ (washer/disinfector),** and the final outcome of the standardized process. Mineral and sediment content in the water supply can leave deposits on the mechanical components of **System 83 Plus (washer/disinfector),** alter the effectiveness of the germicide, and leave deposits on the endoscope and internal channels.

Potable water contains resident waterborne microorganisms that under normal conditions are not of clinical concern. However, they are required to be removed when reprocessing flexible endoscopes for patient safety.

Custom Ultrasonics FDA 510(k) approval for System 83 Plus (washer/disinfector) requires the installation of a 5 micron filter inside a 20 inch in length housing for removing sediment from the water lines. In addition, a 510(k) FDA approved 0.1 micron bacterial filter within a 20 inch housing following the 5 micron sediment filter. A 25 micron sediment filter or an automatic back flush system may be required before the 5-micron sediment filter where there is high level of particles in the water supply.

Contact Custom Ultrasonics for information on water filter systems.

Water temperature is critical to the process outcome and should be set to 110° Fahrenheit. Ultrasonic sound waves in combination with Tergal 800 (detergent), and proper water temperature are compatible with flexible endoscopes. The sound waves potentiate the detergent aiding removal of the contaminants from the flexible endoscopes and its re-moveable parts during reprocessing.

The water temperature should never exceed 120° Fahrenheit.

Detergents:

"Detergents are complex chemicals when dissolved in water in the proper concentration will breakdown and dissolve grease, oil, and other foreign matter, or will break up and suspend these materials in the solution so that they can be removed in the cleaning process."

Available are a variety of detergents for cleaning medical devices. Selecting an appropriate detergent will be dependent on its effectiveness and compatibility with the 3 minute validated and standardized cleaning phase for System 83 Plus (washer/disinfector). It should be low foaming and free rinsing.

Enzymatic formulations to dissolve **protein** contaminants during soaking have a specified dilution rate, immersion time and temperature requirements. The manufacturer's labeling should be reviewed to determine the specifications for effectiveness.

We have no objection to the selection of enzymatic formulations or detergents for use with System 83 Plus (washer/disinfector) **as long as the manufacture can provide in writing data showing that it is effective with the 3 minute ultrasonic wash and its concentration and/or dilution is compatible with the components for System 83Plus.**

It is recommended that enzymatic formulation be considered for dissolving organic contaminates from flexible endoscopes when there is an expectation that the endoscope will not be processed within a reasonable time period. Required is: "The right combination of time and water temperature to assist in the breakdown of dried organic contaminants".

Mechanical Action during the System 83 Plus™ Cleaning Phase:

Mechanical scrubbing action, in combination with a detergent, is necessary during almost every cleaning process. System 83 Plus™ (washer/disinfector) employs an oscillating re-circulating pump with medium and high pressure outputs to clean and purge the endoscope channels along with ultrasonic sound waves during the cleaning phase.

The *low intensity,* sound waves of the System 83 Plus™ have been found for the past 20 years to be compatible with flexible endoscopes, and have shown to achieve a higher level of cleaning and rinsing. *Low intensity sound waves* within the solution set into motion molecules in the water and detergent at a very rapid rate creating small bubbles. When these bubbles reach a critical mass, as a result of high and low pressure waves, they implode creating a vacuum that draws contaminates from the surface of the endoscope, its inaccessible areas and crevices resulting in a much cleaner surface that is necessary before immersion in a liquid germicide.

Time Requirements for the Standardized Process:

Each phase of the standardized process has been tested, validated, timed and automated and has a proven record of performance over the last twenty five years. The standardized process has shown to remove, under worse case scenario simulated-use testing, contaminates during cleaning, the microorganisms during immersion in a germicide, and thorough removal of any residual germicide during rinsing.

Contact Custom Ultrasonics for information on our patented testing protocol #6,428,747 and the 510(k) Summary and Overview for Safety and Effectiveness.

The cycle time of the **standardized process** varies and is based on the length of the immersion time for the germicide selected and the number of rinses as required in the germicide's labeling.

Liquid Chemical Germicide ("LCG"):

Custom Ultrasonics does not recommend a specific chemical germicide except as it may relate to the germicide's compatibility with the **System 83 Plus™ (washer/disinfector)** and flexible endoscopes.

Contact Custom Ultrasonics to confirm the germicide selected is compatible with System 83 Plus™(washer/disinfector) and for any additional information as it relates to the use of the germicide.

The computer and software for **System 83 Plus™ (washer/disinfector)** controls the germicide temperature in the reservoir, during immersion in the processing chamber, and as the germicide passes through the internal channels of the endoscope. Two Celsius temperature scales are displayed on the VGA Color Monitor for verification.

Processing Accessories:

Because reusable forceps can penetrate the mucosal membrane, they are considered a critical device and can serve as a potential vector for cross infection. The requirements for processing forceps are different from the endoscope because contaminates become entrapped between the spring housing and shaft making manual cleaning difficult. The use of **high intensity sound waves** improve the cleaning and rinsing of reusable forceps.

A **separate high intensity ultrasonic chamber** for cleaning reusable forceps is available and can be included with a **System 83 Plus™ (washer/disinfector)**. The sound waves will drive the detergent and warm water between the spring housing and shaft removing the contaminants. The sound wave functions in the same manner during rinsing removing any residual contaminants and detergent.

Please contact the factory for additional information

Endoscope Drying and Storage:

Because the internal channels of flexible endoscopes retain water that may contain waterborne microorganisms, **thorough drying before and during storage** is required. Air will not circulate through the internal lumens of flexible endoscopes without some assistance.

After completion of the **standardized process**, the lumens of a flexible endoscope should be purged with **70% isopropyl alcohol using forced air.**

Procedure: Fill a 60cc syringe with 10cc of air, and 25cc of alcohol, connect the Alcohol adapter to the syringe and insert the adapter in the bulkhead fitting on **System 83Plus**. Follow the same procedure when reprocessing two instruments

Press the plunger of the syringe injecting the air and alcohol, remove the syringe and adapter, and engage the air pump switch. Allow the air pump to **operate for no less than 1 minute** to force the alcohol through the internal lumens of the endoscope. The air pump is designed

to operate for any length of time, but must be disengaged before initiating the **standardized process**.

The endoscopes **should be hung in a vertical position in a well ventilated room, the operating buttons removed,** the control head,

insertion tube, and umbilical cord protected from damage.

A flexible endoscope should never be stored in its suitcase.

Contact Custom Ultrasonics for information on a storage cabinet available that is programmed to purge endoscope channels with forced air to reduce the humidity level to less than 35% eliminating all microorganisms during storage.

Standardized Process System 83 Plus

System 83 Plus (washer/disinfector) offers an approved, automated, validated, standardized and documented process as provided in its 510(k) submission. System 83 Plus(washer/disinfector) achieves as much as a 9 log reduction of contaminates and

Mycobacterium species when used in accordance with its labeling, and the labeling of the selected germicide. As much as a 12 log reduction can theoretically be obtained when the endoscope is pre-processed in accordance with SGNA guidelines.

For each Flexible Endoscope reprocessed in System 83 Plus (Washer/Disinfector), the following print out is provided:

Start:
Day/Date/Month/Year
Flexible Endoscope –Model – Serial Number
Physician Name
Patient Name – ID
Technician Name
Detergent Name
Disinfectant Name
Time Process Started
Wash Time
Rinse Time
Disinfectant Time – Temperature
First Rinse Time
Second Rinse Time
Third Rinse Time
Time Process Completed
Time Duration of the Process

Physical Description of System 83 Plus™

The System 83 Plus™ (washer/disinfector) is a mobile, free standing unit with a power cord, hospital grade electrical plug, hot and cold water lines, and 2 waste drain hoses. The cabinet is painted carbon steel and the germicide and processing chambers stainless steel recessed under a Corian counter top. Located on the front of the Corian counter top is a keyboard, at the rear a VGA Color Monitor, printer, hand spray, and a bulkhead for injecting 70 % alcohol. The covers over the processing chamber and germicide reservoir chamber are clear.

Available as an option is an automatic foot pedal operated cover for the processing chamber for convenient handling when loading and unloading flexible endoscopes, the operating buttons and miscellaneous re-moveable parts.

On the front door panel of System 83 Plus is a switch for the air pump and hand spray. A 3rd switch noted **ERCP** is installed when monitoring the flow and pressure through individual channels of flexible endoscopes is selected.

A circuit breaker, mounted on the rear wall of the cabinet or on the right side wall of the cabinet, serves as the main power switch for the System 83 Plus™. The circuit breaker should remain in the "ON" position, and turned "OFF" by a qualified technician before performing service or maintenance on System 83 Plus (washer/disinfector).

The ON/OFF button for System 83 Plus is located inside the front door of the cabinet on the computer.

Electrical Requirements:

System 83 Plus™ requires a **DEDICATED 120 Volt, 20-amp 60Hz** receptacle. A **GFI receptacle is not recommended** since the System 83 Plus contains an electrostatic isolation transformer that reduces leakage to ground and may trip the hospital breaker, the system's breaker or both.

NOTE: Do not connect or operate System 83 Plus during the use of an emergency generator that may create surge currents that may damage components.

Plumbing Requirements:

The hot and cold water lines for System 83 Plus can be ½" or ¾" copper with shut off valves having ¾" male garden hose adapters. The number of hot and cold water lines required is based on the number and type of independently operated systems selected.

The required water pressure is **30 to 50 PSI** with a flow rate of between 8-10 GPM. If the water pressure **exceeds 50 PSI a pressure reducer valve must be installed.**

Water temperature **110 degrees F** not to exceed **120 degrees F.**

If plumbing code requires a vacuum breaker, install only a **non-atmospheric vacuum breaker.**

Waste drain requirements: :

"**Standpipe**" - 2 inches in diameter and 18" above floor level

and/or

"**Washer Box**"- configured for water supply and drain.

Computer Hardware:

System 83 Plus (washer/disinfector) contains an IBM compatible CPU, Keyboard, High Resolution Color Monitor, and Printer. The keyboard and monitor have protective covers.

The keyboard protective cover should be cleaned periodically, and the VGA Color monitor and protective cover cleaned with a soft cloth that will not scratch the glass like finish. The printer should be checked periodically for paper.

Manuals: for System 83 Plus™ are forwarded with System 83 Plus.
Additional Manuals are available: The Operator's Manual part #13024
Bio-Medical Manual part #13029

Installation:

System 83 Plus (washer/disinfector) is shipped via United Van Lines and should be inspected upon receipt for damage, and the number of items received compared to the bill of lading. The hospital moves the System to the designated area for installation.

System 83 Plus (washer/disinfector) **can not be operated until the arrival of the factory engineer for training.**

In-Service Training Program:

Following delivery of System 83 Plus (washer/disinfector), a date must be establish for the training of Operating and Bio-medical personnel by a factory engineer. The training date and departure date for the Engineer cannot be scheduled until the company has a complete listing of all flexible endoscopes, and the engineer has all the required adapters for the listing of endoscopes. **The germicide selected for use** in System83 Plus **must be available** for the training session.

The **In-Service Training Program** is a day and a half in length unless prior arrangements are made. During the In-Service Training, personnel will operate System 83 Plus (washer/disinfector), match adapters to the individual flexible endoscopes and to the different pressure outputs of the purging manifold for System 83 Plus.

For personnel assigned the responsibility for reprocessing flexible endoscopes, attendance will assure all sections of the training program are reviewed and the handouts, charts and instructions are understood and retained for reference. Maintenance and Bio-Medical personnel are encouraged to attend the training on routine required maintenance procedure, the operating software program , and the software diagnostic service program.

Retraining of personnel and for newly assigned personnel,
a training program is available at a cost of $2,500 (subject to change)

Routine Maintenance Procedure Check List

FOR TECH SUPPORT CALL (215) 364-1477 FOR ASSISTANCE

NOTE* BEFORE TURNING THE MACHINE OFF, VERIFY THE FLOW OF ALL ADAPTERS.

A: ADAPTER FLOW OUTPUT CHECKED {NOTE ANY OCCLUSIONS}

Low pressure ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10

High pressure ____1____2

Routine maintenance check list for (CU) machines.

B: Inspect and clean Every 3 months

1. Drain solenoid
2. Residual drain solenoid
3. H/L/D feed solenoid
4. H/L/D Return solenoid
5. Water (H2O) solenoid
6. Rinse solenoid (if equipped)
7. Air solenoid(s)
8. Detergent Solenoid (if equipped)
9. Purge screen
10. Air pump heap filter

Inspect and clean every 6 months

1. H/L/D feed pump
2. Drain pump
3. Flow probe
4. Air pump particulate filter (1 year)

C: Tubing and plumbing inspection

1. Are all clamps secured?
2. Are all compression fittings secured?
3. Are all unions on PVC plumbing tight?

D: Cables integrity computer

1. Power cord
2. Thermocouple(s)
3. Video
4. Printer
5. Keyboard
6. I.O. and A/D Cards
7. Power strip
8. 37 pin A/D cable

MUX BOX

1. 37 pin A/D
2. Thermocouples

INTERFACE

1. twist lock
2. 110VAC 24 pin cable
3. 5VDC 24 pin cable
4. 37 pin I/O cable

E: Inspect all pumps for leaks

1. H/L/D feed pump
2. Drain pump
3. Purge pump (oscillating or aquatech)
4. Residual drain pump
5. Flow jet (hp) (if equipped) if purge pump is oscillating type
6. Detergent pump
7. Air pump (check air flow thru all adapters)
8. Vacuum pump (replace back pack and floor filters)

F: Sensors

1. Do the vent sensors turn off the vacuum pump?
2. Clean vent sensors (do not use alcohol or abrasives)
3. Inspect and clean all floats (do not use alcohol)
4. Make sure red wire and grounds for flow probe are tight
5. Inspect pressure switch(s) for leaks and connections

G: Ultrasonics

1. Check wires on crystals
2. Check ground between generator box and processing chamber
3. Clean louvers on generator box

H: External hoses and tubing

1. Disinfect detergent line with 1/50 ratio bleach and water (H2O) and allow to soak (30 minutes min. to 60 minutes max) whenever the .1 micron filter is replaced.
2. Check water (H2O) inlet hose for rust and wear
3. Check drain hose for rust or wear
4. Inspect rinse gun for leaks once the water is turned back on
5. Check all scope adapter "O" rings for wear

Disinfecting Detergent Line

When replacing the (.1 micron) filter, you must disinfect the detergent line(s) with a bleach solution consisting of a 1/50 ratio bleach and water (H2O). Allow the line to soak (30 minutes min. to 60 minutes max.) Prior to performing the steps below, unscrew the detergent bottle from the pump assembly. In a one gallon container filled half way with bleach solution, connect it to the pump assembly. The following steps will be performed on the computer in the service program:

1: The entire system is turned "On" by opening front door of unit and engaging On/Off switch on CPU located in lower right hand corner of the machine. Allow the computer to perform the "Boot Up" procedure. When the computer is ready, a gray MASTER MENU screen will appear.

2: Red highlighted letters on menu are the activation keys. Hold down the ALT key and press the C key. Press the down arrow key and highlight SERVICE, press Enter. A blue selection bar will appear on the bottom.

3: Use arrow key and highlight DIGITAL I/O. Press Enter. A component screen will appear (see below) the highlighted cursor will be located on 1-1. This cursor is controlled by the arrow keys.

		Bay Outputs 1 2 3 4	Bay Inputs 1 2 3 4	
ultrasonics	1	O O O O	O O O O	1 flow
drain pump	2	O O O O	O O O O	2 float
drain sol.	3	O O O O	O O O O	3 safety
water in sol.	4	O O O O	O O O O	4 lubrication
oscillating pump	5	O O O O	O O O O	5 water channel
disinfectant pump	6	O O O O	O O O O	6 reservoir pump
disinfectant feed sol	7	O O O O		
disinfectant return sol.	8	O O O O		
residual drain pump & sol.	9	O O O O		
air pump & sol.	10	O O O O		
lub pump and sol; (83 det)	11	O O O O		

4: To activate the detergent pump, highlight the circle next to number 11 detergent 83 and press the SPACE BAR. Allow the bleach solution to be pumped into the round processing chamber. Once the bleach solution is coming through the detergent line, de-activate the component by pressing the SPACE BAR.

5: Allow the bleach solution to sit in the detergent lines for at least 30 minutes and no more than60 minutes to achieve disinfection.

6: On completion of the soak time remove the bottle filled with bleach solution from the pump assembly and place a new bottle of detergent on to the pump assembly.

7: To activate the detergent pump, highlight the circle next to number 11 Detergent 83 and press the SPACE BAR. Allow the bleach solution to be pumped out of the detergent lines into the round processing chamber. Once the detergent is coming through the detergent line, de-activate the component by pressing the SPACE BAR.

8: To remove any liquid out of the processing chamber before processing a scope, move the cursor up to number 9 residual drain pump & sol. and allow it to run until the liquid is no longer present. Next, press the space bar a second time to deactivate the residual drain pump.

9: To exit service program, reset computer.

I: replace water (H2O) filters as needed

NOTE Whenever the .1 micron bacterial filter(s) are replaced, ***YOU MUST*** follow both ***CUSTOM ULTRASONICS AND HOSPITAL PROTOCOL*** for sterilizing / disinfecting [e.g., steam autoclave @ 121 degrees C, for 30 min.] the filter housings, and sterilizing / disinfecting the (SYSTEM 83) internal copper lines. This includes the water (H2O) inlets and the rinse gun (if equipped).

Follow instructions on following page.

Installation, Disinfection & Replacement Procedures For The Water Inlet Filter Assembly & Water Inlet Plumbing Line(s)

REQUIRED PARTS:

1 fresh gallon of 2% activated glutaraldehyde per water inlet(s) set
Rubber band(s) per chamber (if machine is equipped with rinse hose)
Large pliers and/or channel locks
Towels, gloves and protective clothing and glasses
Glutaraldehyde hand pump assembly ..... #11011
25-micron pre-sediment filter(s) (for triple canister set-ups)..... #13015
5-micron sediment filter(s) ..... #13016
FDA (510K) cleared 0.1 micron bacteria filter(s) ..... #13017
5" brass nipple coupling (between housings) ..... #11014
Removable filter gauges ..... #13040 & #13042
Filter wrench ..... #13045
Hose "Y" connector ..... #11038

OPTIONS:

Replacement water inlet hose(s) ..... #11004
Replacement O-Ring for each filter canister ..... #13038

NOTE: During the procedure the term "PROCESSING CHAMBER" refers to all available chambers, which can range from one (1) to four (4) depending on the purchased Custom Ultrasonic system.

"WATER SUPPLY" refers to all available hot and cold water lines supplying the equipment from a FDA cleared 0.1 micron bacteria filter(s) preceded by a 5 micron, 25 micron pre-filter or both.

***IMPORTANT:** Attach 3 or more colored channel-tubing adapters to the System 83 Plus manifold, which contains 9 female bulkheads. If machine is equipped with, high pressure ports make certain one connector for the pressure ports is attached. *Otherwise, damage to the purge pump may occur.*

THE FOLLOWING PROCEDURES MUST BE PERFORMED:

1. When there is a 20 to 25 PSI PRESSURE DIFFERENTIAL between the inlet (see "E2" on diagram) and outlet (see "E3") gauges of the FDA (510K) 0.1 micron bacteria filter(s) (see "J"), when the machine is filling.

2. Under normal operating conditions, once every 6 MONTHS for the FDA (510K) cleared 0.1 micron, bacteria filter(s).

NOTE: This procedure does not have to be performed when changing the 5 or 25-micron pre-filter(s) (see "G"). The 5 or 25 micron pre-filter must be replaced EVERY 3 MONTHS and/or when the entire processing time increases 5 to 10 minutes.

STERILIZATION OF FILTER ASSEMBLY PROCEDURE:

1. Turn the hot and cold-water valves "OFF" at the wall (see "A" on diagram).

2. Turn the computer "ON", and enter the program by holding down the ALT key and pressing the letter U. Once in the standard operating screen press F6 Wash button. Allow the water to drain out of the plumbing lines and then turn off the computer. Remove the machines electrical plug(s) from the wall outlet for safety (see "O").

3. Unscrew the lower section of the 5 micron sediment (see "F2") and FDA (510K) cleared 0.1 micron bacteria (see "I2") filter canisters, remove and dispose of the filters since they can not be reused (see "G" & "J"). Clean the canisters with soap and water and rinse thoroughly.

4. Disconnect the water filter supply hose(s) (see "B") from the input and the machine water inlet hose (see "K") from the output connectors of the filter assembly.

5. Remove all pressure gauges (see "E1, E2 & E3") from the filter upper canister(s) (see "F1 & I1") and the four (4) wing nuts holding the aluminum frame (see "D") to the white wall mount bracket (see "C").

6. Send the cleaned filter canisters, O-rings (see "H") and the aluminum frame, with the new FDA cleared 0.1 micron filter(s) to be heat sterilized. **[Autoclave for 30 minutes at 121°C (252°F)]**

   NOTE: The plastic covering that the replacement FDA (510K) cleared 0.1-micron filter comes in must be removed prior to heat sterilization.

FILTER RE-ASSEMBLY PROCEDURE:

1. Connect the aluminum frame (see "D") to the wall bracket (see "C"), secure it with the four (4) wing nuts, and connect all pressure gauges on the filter assembly.

2. Install the 5-micron sediment filter (see "G") by securing the male end firmly up and into the female socket of the upper canister (see "F1") attached to the aluminum frame. Carefully lubricate the O-Ring (see "H") with distilled water, seat it and screw the lower canister (see "F2") into the upper canister until secure.

3. Expose only the male end of the FDA cleared 0.1-micron bacteria filter (see "J") from the sterile packing being careful not to contaminate the filter. Holding the sterile packaging, insert the male end of the filter firmly up and into the female socket of the upper canister (see "I1"). When firmly in place, remove the remaining sterile packaging. Carefully lubricate the O-Ring (see "H") with distilled water, seat it and screw the lower canister (see "I2") into the upper canister (see "I1") until secure.

STEP#2

DISINFECTION OR STERILIZATION OF WATER INLET LINES PROCEDURE:

1. If you elect to replace the water inlet hose(s), (see "K" on diagram) remove the present hoses, and connect the new water inlet hoses to the System 83 Plus (see "M").

2. Screw the GLUTARALDEHYDE HAND PUMP ASSEMBLY (#11011) (see "Q") into a fresh gallon of glutaraldehyde (see "P"), and connect the hand pump adapter to the water inlet hose(s) (see "K").
   - When disinfecting the hot and cold black water fill lines (see "K") to the System 83, use a Y connector (see "Q") on the hand pump assembly so that both lines can be disinfected at the same time.
   - If the system only has one water fill line, a Y hose connector must be added on to the machines hot and cold inlet lines. This Y connector should remain hooked up to the machine permanently (see "R").

   Note: Follow hospital policy on handling of glutaraldehyde.

3. Plug the electrical line cord from the System 83 Plus into the wall receptacle (see "O"), and turn the computer switch "ON". Return to the standard operating screen. If not familiar with standard operation of the system, please locate operator instructional manual or call Custom Ultrasonics (215-364-1477) for assistance.

   I. Press function key F6 WASH only on the keyboard. If machine is equipped with a rinse hand sprayer (see "N"), turn on the rinse switch. To keep hand sprayer open during this procedure place a rubber band around the spray nozzle handle (see "N") and place the nozzle handle in the processing chamber. Duplicate for a dual system.

   II. Hand pump ¾ of the fresh gallon of glutaraldehyde (see "P") into the System 83 Plus. Confirm that the chemical has passed threw the water inlet(s) and hand sprayer(s) into the processing chamber. As the chemical is passing threw the hand sprayer handle unwrap the rubber band and return handle back to holder. Turn the rinse switch "OFF" (if equipped) and the computer "OFF". Pump the hand pump until resistance is felt.

   III. Follow manufactures recommendation of the glutaraldehyde on how to achieve sterilization or high-level disinfection.

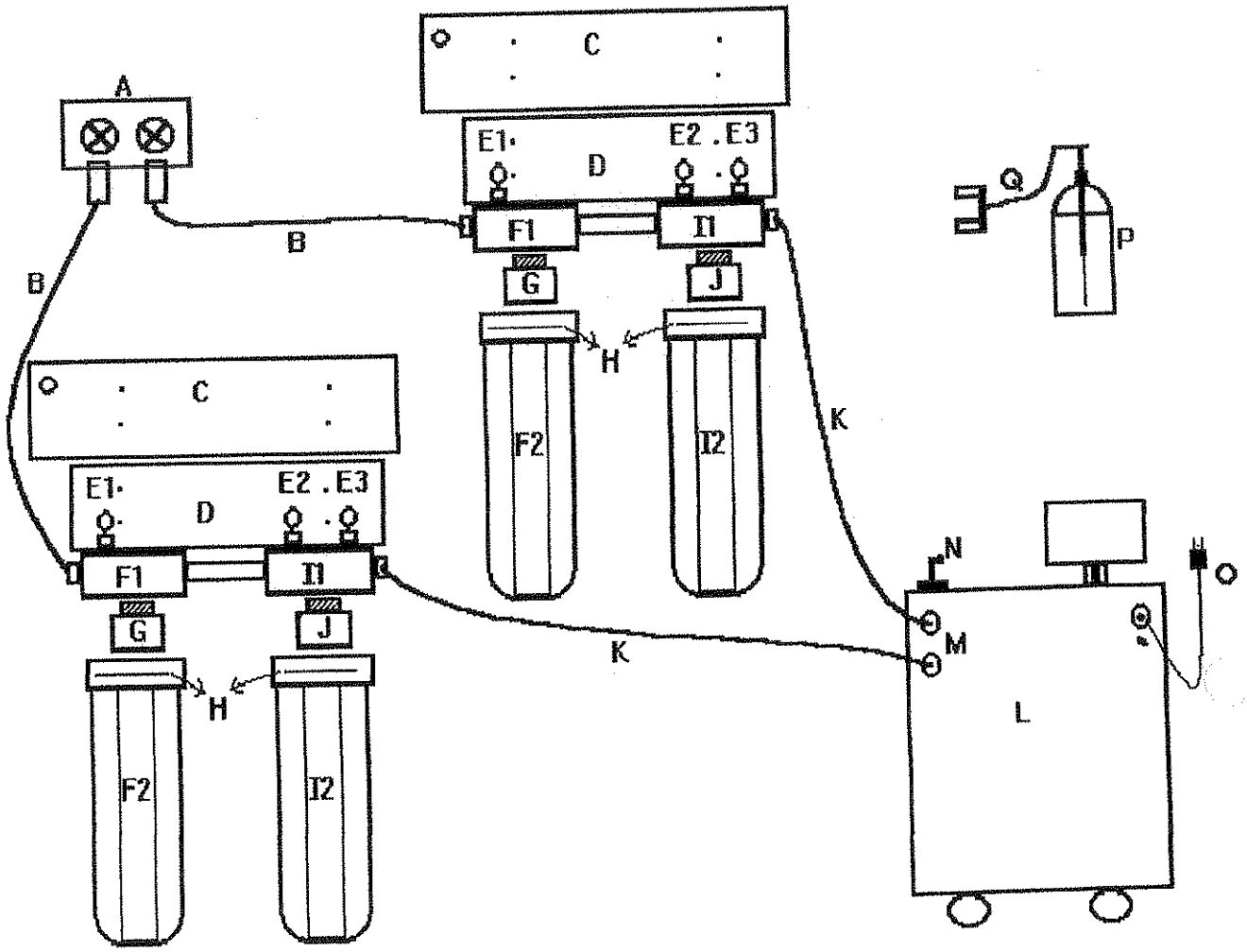
4. On completion:
   I. Turn the computer switch "ON". If not familiar with standard operation of the system, please locate operator instructional manual or call Custom Ultrasonics (215-364-1477) for assistance. Select and press function key F6 WASH only on the keyboard. Pump the remainder of the glutaraldehyde from the gallon container.

   II. Disconnect the glutaraldehyde hand pump assembly from bottle and connect the water inlet hose(s) (see "K") from the System 83 Plus to the output of the sterilized FDA (510K) cleared 0.1 micron bacteria filter(s) assembly (see "I1"). Connect the water filter supply inlet hose(s) (see "B") from the wall valve (see "A") to the input of the 5 and/or 25 micron pre-filter(s) (see "F1").

   III. Slowly turn the water valve(s) "ON" and allow the water to trickle into the 0.1-micron filter canister until the 0.1-micron filter is submersed in water, at this point the valves can be opened to full capacity. Then adjust water temperature (between 110° and 120° degrees F), using hot and cold, water valves (see "A") and a thermometer. The machine will now run a wash rinse cycle, which should take about 7 minutes. During the fill for the rinse phase turn on the rinse switch and spray the rinse nozzle (see "N") into the processing chamber until the machine stops filling. Allow the system to complete the wash rinse cycle. The operator may now use machine.

HOT & COLD FEED LINES THROUGH FILTERS TO SYSTEM 83 PLUS™

(WATER CANNOT EXCEED 120° F)



A) hot and cold water valves

B) water supply hose(s) from wall to 5 micron canister

C) white wall mount bracket

D) aluminum frame bracket

E1) pressure gauge for inlet of 5 micron canister

E2) pressure gauge for inlet of 0.1 micron canister

E3) pressure gauge for outlet of 0.1 micron filter canister

F1) upper canister of 5 micron filter

F2) 5 micron filter canister

G) 5 micron filter

H) 0-ring for canisters

I1) upper canister of 0.1 micron filter

I2) 0.1 micron filter canister

J) FDA cleared 0.1 micron filter

K) water hose(s) from filter assembly to machine inlet

L) System 83 Plus

M) water inlet(s) of machine

N) hand spray nozzle

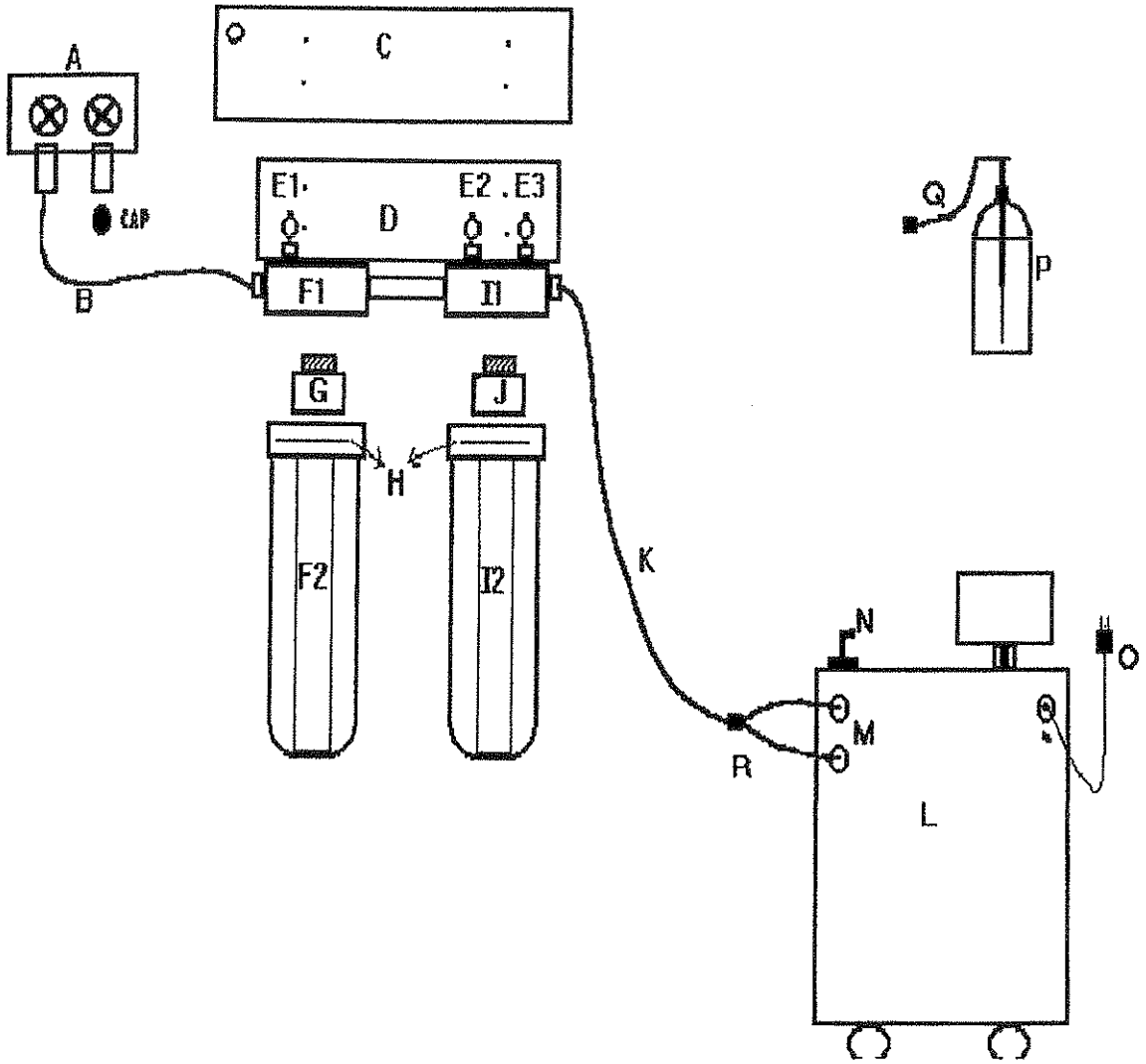
O) electrical plug

P) fresh activated glutaraldehyde

Q) glutaraldehyde hand pump

HOT FEED LINE THROUGH FILTERS TO SYSTEM 83 PLUS™

(WATER CANNOT EXCEED 120° F)



A) hot and cold water valves

B) water supply hose(s) from wall to 5 micron canister

C) white wall mount bracket

D) aluminum frame bracket

E1) pressure gauge for inlet of 5 micron canister

E2) pressure gauge for inlet of 0.1 micron canister

E3) pressure gauge for outlet of 0.1 micron filter canister

F1) upper canister of 5 micron filter

F2) 5 micron filter canister

G) 5 micron filter

H) 0-ring for canisters

I1) upper canister of 0.1 micron filter

I2) 0.1 micron filter canister

J) FDA cleared 0.1 micron filter

K) water hose(s) from filter assembly to machine inlet

L) System 83 Plus

M) water inlet of machine with hose Y connector

N) hand spray nozzle

) electrical plug

P) fresh activated glutaraldehyde

Q) glutaraldehyde hand pump

R) "Y" hose connector

J: FUNCTION TEST

1. Ultrasonics (minimum of 2 "(inches) of water (H2O) in the round chamber)
2. Function test all of the solenoids, pumps, and sensors
3. Reservoir heating pad (heat float must be listed)
4. Processing chamber heating pad
5. Check for leaks on all components that were worked on

K: Test run a full cycle{(F8) wash and D/S/P

1. Plug an adapter into every port and check each one for flow
2. Check during cycle for leaks
3. During the cycle, try to achieve a water (H2O) temperature of 110 degrees F (_____ temperature)
4. During the cycle, try to achieve a fill time of 40 –50 seconds
5. After the cycle completes, press F2 to print. Check the date and time. **ALSO CHECK THE DISINFECT OR CHEMICAL IMMERSION TIME.**

(Time _____minutes)- Chemical immersion
(Time _____minutes)- Total cycle time

SERVICE PROGRAM INSTRUCTIONS FOR CUSTOM ULTRASONICS PLUS PROGRAM

Step 1: Entire system is turned "On" by opening front door of unit and engaging On/Off switch on CPU located in lower right hand corner. Allow the computer to perform the "Boot Up" procedure. When the computer is ready, a gray MASTER MENU screen will appear.

Step 2: Red highlighted letters on menu are the activation keys. Hold down the ALT key and press the C key.

Step 3: Press the down arrow key and highlight SERVICE, press Enter.

Step 4: A blue selection bar will appear on the bottom.

Step 5: Use arrow key and highlight DIGITAL I/O. Press Enter. A component screen will appear (see below) the highlighted cursor will be located on 1-1. This cursor is controlled by the arrow keys.

		Bay Outputs 1 2 3 4	**Bay Inputs** 1 2 3 4	
ultrasonics	1	**O** O O O	O O O O	1 flow
drain pump	2	O O O O	O O O O	2 float
drain sol.	3	O O O O	O O O O	3 safety
water in sol.	4	O O O O	O O O O	4 lubrication
oscillating pump	5	O O O O	O O O O	5 water channel
disinfectant pump	6	O O O O	O O O O	6 reservoir pump
disinfectant feed sol	7	O O O O		
disinfectant return sol.	8	O O O O		
residual drain pump & sol.	9	O O O O		
air pump & sol.	10	O O O O		
pump lubricant (81); detergent (83)	11	O O O O		
reservoir heating pad	12	O O O O		
bay heating pad	13	O O O O		
detergent pump (81)	14	O O O O		
enzyme pump (81)	15	O O O O		

Step 6: To activate the component, highlight the circle and press the SPACE BAR. To de-activate the component press the SPACE BAR again. Multiple components can be turned on at the same time.

Step 7: Only outputs can be activated by the cursor and space bar. To end service program, press Enter. The blue bar will appear. Use arrow keys and highlight EXIT. Press Enter.

Step 8: From the gray Master Menu screen, return to standard operation screen by holding down the Alt key and pressing the U key.

SYSTEM MAINTENANCE

Good Housekeeping Methods:

There are routine housekeeping methods that must be performed to maintain your System 83 Plus™ in good operating condition, and to maintain its aesthetics:

Overnight Decontamination of the Internal Plumbing:

Before completion of the good housekeeping methods, you may implement decontamination of the internal plumbing of your System 83 Plus™.

This procedure should be used when the chemical is about to expire do to the fact that the chemical will all be discarded out of the machine.

After determining that the level of active ingredient in the germicide chemical is adequate, the internal plumbing and the associated mechanical components of the System may be filled with the germicide:

Note: H/L/D has to be above minimum effective concentration.

1. Connect at least three (3) scope adapters to the BULKHEADS from the **right to the left** if the manifold is inside the chamber, if the manifold is on top of the machine the adapters should be connected from rear coming forward.

2. Press **F4 to enter "SPECIAL PROGRAMS".**

3. Press **F6 Purge** to start the emptying process of the chemical.

4. Allow the chemical agent to exit the chemical reservoir until 1 to 2 inches remain in the reservoir then Press **F1 Stop Maintenance.**

5. Shut the device off and allow the chemical to remain in the lines for the required time period. Follow the label directions of the chemical agent to achieve the level of decontamination/sterilization desired.

6. Upon completion of the proper soak time, turn ON the device and enter into the standard screen. Follow the instructions, on the next page to F6 Purge the system.

F6: PURGE (Changing Chemical Germicide:)

There are several germicides available to chemical immerse your medical device(s).Custom Ultrasonics, as the manufacturer of System 83 Plus™ , does not recommend a specific chemical germicide except as it may relate to the germicides compatibility with the System 83 Plus™ . Read the label directions for its specific use life and use pattern. When the reuse life has expired, or when the agent has reached its MINIMUM EFFECTIVE CONCENTRATION, the chemical must be purged from the chemical reservoir. The reservoir must be cleaned using GOOD HOUSEKEEPING METHODS prior to refilling with the newly activated chemical agent.

1. Connect a minimum of three (3) adapters to bulkheads.

2. Press **F6 to PURGE** the System of the chemical agent. The chemical agent will be pumped from its reservoir into the processing chamber, and from the processing chamber into the hospital waste line. **Keep lids closed** during the PURGE phase to prevent chemical vapor from entering room air.

3. When no solution remains in the processing chamber Press **F1 STOP MAINTENANCE**. The PURGE PUMP moves the solution at a rate of fifteen (15) gallons/minute.

4. Initiate GOOD HOUSEKEEPING METHODS to clean the chemical reservoir.

   a. Clean the reservoir and processing chamber with a small amount of chlorine based agent such as Comet or Ajax and a soft cloth (Lint Free).

   b. A hand spray is attached to the back plain of the machine. Holding the hand spray, engage the **"RINSE"** switch, and a light will appear indicating water to the hand spray. To rinse the cleaning compound from the reservoir and processing chamber, depress the handle on the hand spray.

   c. Press **F6 PURGE** to remove the cleaning compound from the reservoir and processing chamber.

   d. Continue to use the hand spray until all cleaning agent residue has been removed from the reservoir and processing chamber.

   e. When you have finished, turn the **"RINSE"** switch **"OFF".** The rinse light will go "OFF" and place the hand spray into its holding bracket.

   f. Press **F1 STOP MAINTENANCE**.

   g. Pour one (1) quart of newly activated chemical agent into the reservoir and Press **F6 PURGE.**

Problem Solving

System Diagnostics:

The SYSTEM DIAGNOSTICS PROGRAM should be performed by trained qualified Biomedical or Maintenance personnel during routine maintenance procedures, or as a response to a system FAULT. This program is used to assure or check the operation of the mechanical components in your System 83 Plus™.

1. Return to the MAIN MENU BAR. Press the **ALT** and **C** keys simultaneously. Using the arrow keys, highlight SERVICE and Press **ENTER.**

2. When the service screen appears, using the arrow key, move to the "digital I/O test" and Press **ENTER**.

3. Select the BAY desired by moving the arrow key. The component circle will illuminate indicating the BAY and COMPONENT you have selected.

4. After selecting the appropriate component, press the **SPACE BAR** to activate the component. The circle will turn red and the component should function. If the light does not come on, there is a problem with the I/O Board. Contact Custom Ultrasonics At 215-364-1477 for further instructions. If the component functioned properly, then everything is OK. Press the SPACE BAR a second time to de-activate the component.

   If the component light comes on but the component does not,

   A. check to see that you have 110 volts at the outlet plug and that the circuit breaker on the back of the machine is up;

   B. check if the mechanical component has failed;

   C. check interface relay is burned out CONTACT FACTORY 215-364-1477.

5. After completion of the SYSTEM DIAGNOSTICS, Press **ENTER** to exit the service program.

6. To return to the main program, move cursor to **EXIT** and press **ENTER.**

7. The MAIN MENU BAR will appear. Press the **ALT** key and **SPACE BAR** simultaneously. A vertical Menu will appear. Press the down arrow key and highlight **"RUN CU"**. Press **ENTER**.

SYSTEM FAULT may occur during a processing program. If the System should FAULT, the computer will abort the process in progress, and a BEEP will sound. A screen prompt, F1, will appear on the blue bar followed by the FAULT. The RED arrow on the process dial will move to COMPLETE. To clear the FAULT: press F1 this will stop the BEEP. (make sure to note the fault on a note pad before clearing)

FAULT CODES:

1. **F1: Clears Error, Check Water Channel**
   This indicates that the liquid flow to the instrument channels has been interrupted. Contact BIOMEDICAL ENGINEERING to determine function of the oscillating pump and/or flow sensor.

2. **F1: Clears Error, Safety Float Activated**
   This indicates that a safety float has been triggered, either in the reservoir or the processing chamber.

   a. Select F4 Special, Press F5 Empty to empty the water out of the processing chamber. If the chemical is in the processing chamber then Press F7 Return H/L/D. If reservoir float is raised, purge the chemical out of the machine and call bio-med to clean the disinfect return solenoid.

   b. When the processing chamber is empty, press F1 Stop Maintenance. Return to F3 Standard screen and re-start machine after reading step c. Note below.

   c. Note: Check operational float to make sure float is not sticking in the down position. Check water entry into the System to make certain it is not entering at an abnormal rate.

3. **F1: Clears Error, Invalid Start State**
   This error will occur if the operator attempts to initiate a cycle with a full processing chamber or if the safety float is activated. In order to start a cycle the operator must empty the processing chamber.

   a. Select F4 Special, either F5 Empty the liquid out of the process chamber or F7 Return H/L/D to return the chemical back to the reservoir. When all of the liquid has emptied out of the chamber, Press F1 Stop Maintenance and return to F3 Standard screen. If reservoir safety float is raised then you must purge the chemical and call bio-med to clean the disinfect return solenoid.

   b. Re-start machine at this point. If problems continue call CUSTOM ULTRASONICS 215-364-1477.

SYSTEM ERRORS:

1. The level of the chemical in the chemical reservoir is below the "LOW LEVEL" mark:

   a. The process will stall in the chemical fill phase, or

   b. The PURGE PUMP will not engage, and/or

   c. The chemical will not return to the reservoir.

   SOLUTION: Quickly activate one/two gallon(s) of your chemical solution and pour into the **reservoir chamber** until you hear the purge pump ENGAGE. After adding an adequate amount of chemical and the PURGE PUMP has engaged, the immersion time as programmed will begin.

   ALWAYS CHECK THE *H/L/D* LEVEL IN THE RESERVOIR AS INSTRUCTED BY THE COMPUTER TO AVOID THIS ERROR.

2. Processing chamber has "mysteriously" filled with germicide. Debris is lodged in the chemical RETURN solenoid.

   SOLUTION: Select F4 Special Press F7 Return H/L/D to return chemical to the chemical reservoir. Press F1 Stop Maintenance when chemical has returned to its reservoir. Call the Biomedical or Maintenance Department and have the chemical solenoids cleaned.

   NOTE: Review quarterly maintenance schedule to determine that "ROUTINE MAINTENANCE" has been done on schedule.

3. Processing chamber has overfilled with water. Debris is lodged in the water inlet solenoid. TURN OFF THE WATER VALVES AT THE WALL.

   SOLUTION: Call the Biomedical or Maintenance Department to clean the water inlet solenoid.

   Empty processing chamber select F4 Special Press F5 Empty to drain water out of the chamber. When all water has drained out of the chamber, Press F1 Stop Maintenance, then F3 Standard to return back to normal operating screen.

   NOTE: Review quarterly maintenance schedule to determine that the "ROUTINE MAINTENANCE" has been done on schedule and that the sediment filters have been serviced.

4. If loosing large amounts of H/L/D when chemical returns back to the reservoir. Do not run another cycle without contacting Maintenance or Bio-med.

SOLUTION: Clean the drain and the residual drain solenoids looking for a small foreign object that would keep one of those normally closed solenoids open.

NOTE: When cleaning the solenoids always disassemble the residual drain solenoid first then the main drain solenoid. For further assistance with your System 83 Plus™ contact the Service Department at Custom Ultrasonics, 215-364-1477.

COMPUTER INSTALLATION INSTRUCTIONS

Damage due to shipment continues to be a problem. For this reasons on receipt of this replacement computer, BEFORE INSTALLATION, please follow these guidelines.

1. Unplug all AC cables from System 83 and the computer from the wall receptacle.

2. Make note of cable location in the back of computer from System 83.

3. Your new computer will have cable location stickers on the back.

4. Vibration from shipping can loosen cards from mother board. Remove computer cover and reset all cards, including ram chips. Check that all cables inside computer are attached. (If cables are not attached, please call 215/364-1477 for instructions.)

5. Remove white plastic security key from the back of the original computer's printer port. This key should be secured to the back of the new computer's printer port.

6. Replace all cables to correct location and secure with screws.

7. Replace program disk from old computer. (Your new computer may come with a new disk. If so, DO NOT replace with old disk.)

8. Reconnect all AC cables and check circuit breakers.

9. Turn System 83 on. Enter service program and function test all components. When System passes function test, run in normal mode.

If you have any questions about installation, please feel free to call 215/364-1477. Please return all parts including old program to Custom Ultrasonics for inspection. Thank you for your help in the replacement of this computer.

PROCEDURE TO RECOVER FROM LOSS OF SETUP

A. Use this procedure to check and/or reset COMPUTER BIOS SETUP.

B. May be needed if an apparently good bootable disk evokes an error message such as "DRIVE NOT READY ERROR Insert Boot Diskette in Drive A:-Press any key to continue."

C. Probably means that the NICAD rechargeable battery attached to the mother board has discharged over a long period of inactivity or is nearing the end of its useful life.

D. Possibly means that the SETUP program was inadvertently accessed and altered.

E. Explain the following to the customer as the customer is performing the functions. It may be a good idea to do the same thing to a computer yourself while prompting the customer.

PROCEDURE

1. The first screen you will see has a line about ½ way down which reads "Hit <Delete> if you want to run SETUP." Be prepared to hit the <Delete> key as soon as you see the message after reboot.

2. While computer is running, REBOOT by simultaneously hitting <Ctrl> <Alt><Delete> or press the "Reset" button on the front of the CPU. Note: It is never advisable to turn the computer power off and on to reboot unless absolutely necessary.

3. You should now be in a purple and green screen labeled "SETUP PROGRAM".

4. Highlight "Standard CMOS SETUP" using the arrow keys and hit <Enter>.

5. Ignore the warning screen and hit <Enter>.

6. Use arrow keys to move around; <Page Up> and <Page Down> to modify parameters
   a. Set Date and Time if needed
   b. Hard Disk C: Type Not Installed (If a Hard Drive Database Unit, ASK DAN
   c. Hard Disk D: Type Not Installed
   d. Floppy Drive A: 1.44 MB, 3 ½"
   e. Floppy Drive B: Not Installed
   f. At this time ignore all other lines
   g. Hit <Esc> to leave screen

7. Highlight "Advanced CMOS SETUP".

8. Ignore the warning screen and hit <Enter>.

9. Use arrow keys to move around; <Page Up> and <Page Down> to modify
   a. FIND "System Boot Up Sequence"
   b. Verify that it reads "A:,C:"
   c. IF NOT arrow down to highlight and modify to A:, C:
   d. Hit <Esc>

10. Hit the function key <F10> to "Save and Exit"

11. Warning screen will say "Write to CMOS and Exit (Y/N)? Hit <Y> then <Enter>

12. This will continue normal system boot up. If this fails to correct the problem, see George

PART #	DESCRIPTION
	PLUMBING SERIES 11
11000	HEPA FILTER FOR SYSTEM AIR PURGE
11001	BULKHEAD (294-PB-06)
11002	SNAP COUPLING (294-PM-06)
11003	HAND SPRAYER ASSEMBLY
11004	WATER INLET HOSE (6 FOOT)
11005	STAINLESS STEEL FILTER SCREEN
11006	OSCILLATING PUMP
11007	AIR PUMP ASSEMBLY
11008	MAGNETIC DRIVE PUMP - LITTLE GIANT
11009	IMPELLER - LITTLE GIANT MAG DRIVE PUMP
11010	FLO JET PUMP (2100-515A)
11011	WATER INLET DISINFECTION-TWIN ADAPTER
11012	3/4" HONEYWELL/GOYAN KIT
11013	DRAIN CUP
11014	5 " BRASS MALE PIPE THREAD FOR FILTER CONNECTION
11015	CPVC UNION
11016	3/8" HONEYWELL/GOYAN KIT
11017	DETERGENT PUMP (ELECTRIC)
11018	DRAIN HOSE (6 FOOT)
11019	RESIDUAL DRAIN HOSE
11020	3/8" AIR/WATER CHECK VALVE
11021	3/4" PVC TRUE UNION BALL VALVE
11022	3/4" BRASS SWING CHECK
11023	STAINLESS STEEL PURGE CONTROL. 0.5 lbs
11024	DIVING PLATFORM
11025	PPS SINK PLUNGER
11026	BRASS AIR/WATER PURGE ASSEMBLY COMPLETE
11027	HONEYWELL/GOYAN COIL+STEM
11028	LUBRICATION PUMP
11029	ENZYME PUMP
11030	SOLENOID WRENCH LG. Cup style (11067 slim style)
11031	SOLENOID WRENCH SM. Cup style (11068 slim style)
11032	VALUT-LITTLE GIANT
11033	90 DISINFECT FEED ASSEMBLY
11034	S.S. AIR/WATER PURGE ASSEMBLY (COMPLETE)
11035	PVC CHECK VALVE
11036	PVC CHECKVALVE ASSEMBLY (s.s. conversion) COMPLETE
11037	POPPIT VALVE (1) FOR DETERGENT PUMPS
11038	GARDEN HOSE Y CONNECTOR
11039	FRANKIE POP-UP FOR PPS
11040	O-RING LITTLE GIANT PUMP
11041	3/4 SOLENOID O-RING
11042	FILL HOSE S.S. SCREENED WASHER
11043	SOLENOID PEN TYPE SPRING
11044	83 PURGE MANIFOLD WITH BULKHEADS
11045	LITTLE GIANT LAP/ENG 5-MD-HC

11046	LITTLE GIANT SYSTEM 81 TE-5-MD-HC
11047	LARGE BLUE WATER FILL HOSE
11048	BULKHEAD TOOL
11049	FLOAT CLIPS
11050	FAUCET FOR PPS
11051	PRESSURE REDUCER FOR PPS
11052	GAUGE FOR PRESSURE REDUCER
11053	BLACK HOSE CLAMP
11054	DRAIN HOSE 1" BLUE
11055	90 ELBOW FOR 1" BLUE HOSE
11056	HANDLE AND CABLE FOR FRANKIE POP
11057	HIGH PRESSURE BULKHEAD MALE HOSE BARB (black)
11058	HIGH PRESSURE BULKHEAD MALE HOSE BARB (white)
11059	HIGH PRESSURE LURE LOCK ADAPTER WITH FILTER
11060	HIGH PRESSURE HOSE BARB check valve
11061	HIGH PRESSURE 90 HOSE BARB
11062	HIGH PRESSURE INPUT TEE
11063	ALCOHOL FEMALE BULKHEAD
11064	ALCOHOL MALE ADAPTER
11065	ALCOHOL Y FITTING
11066	DUAL HEAD AIR PUMP
11067	SOLENOID WRENCH SLIM STYLE LG.
11068	SOLENOID WRENCH SLIM STYLE SM.
11069	SOLENOID SCREEN 3/4 S.S
11070	SOLENOID SCREEN 3/8 SS
11071	SOLENOID SCREEN 3/4 BRASS
11072	SOLENOID SCREEN 3/8 BRASS
11073	TORQUE WRENCH 0-250 POUND
11074	AIR SOLENOID 1/8 INCH
11075	AIR SOLENOID 5/32 INCH
11076	REBUILD KIT FOR 11074/11075
11077	AIR RELIEF VALVE FOR AIR PUMP
11078	5LB PURGE CONTROL
11079	AQUA TECH PUMP
11080	LARGE AIR PUMP
11081	PVC SPLITTER
11082	AQUA TECH PUMP REVERSE FLOW
11083	FLOW SWITCH AQUA TECH PURGE PUMP US
11084	FLOW SWITCH AQUA TECH PURGE PUMP UK
11085	DUAL HEAD LARGE AIR (BLACK) PUMP
11086	INDIVIDUAL CHANNEL FLOW SWITCH
11087	100 MICRON CAPSULE FILTER
11088	BRASS COUPLING FOR DETERGENT FEED
11089	HOSE VARB FOR INDIVIDUAL CHANNEL FLOW SWITCH
11090	1/2 INCH CHECK VALVE DSP RETURN LINE
	ELECTRONIC SERIES 12
12001	FLOW CONTROL (17AC10)
12002	FLOW PROBE
12003	FLOAT (OPERATING LEVEL INDICATOR)
12004	FLOAT (SAFETY LEVEL INDICATOR)

12005	EOTZ-240D15 RELAY (main power and interface)
12006	GENERATOR SWITCH
12007	AIR INTERRUPT SWITCH
12008	ULTRASONIC GENERATOR (500 W) BOARD ONLY
12009	JA1-T3-A 15 AMP CIRCUIT BREAKER
12010	DIGITAL DISINFECT TIMER
12011	ON/OFF SWITCH
12012	6 AMP ALTERNATE ACTION SWITCH
12013	3 AMP ALTERNATE ACTION SWITCH
12014	3 AMP MOMENTARY SWITCH
12015	LED INDICATOR LIGHT (110 V)
12016	LED INDICATOR LIGHT (5 VDC)
12017	ISOLATION TRANSFORMER
12018	POWER SUPPLY (5 VDC/6 AMP)
12019	PC/BOARD RELAY (RNCNIV-10G-5VDC)
12020	HEATER CONTROL BOARD
12021	DIGITAL TEMPERATURE DISPLAY
12022	TEMPERATURE PROBE
12023	SLIM SOLID STATE RELAY (MICROPROCESSOR)
12024	TRANSISTOR (MJ413 - GENERATOR)
12025	DIODE (IN4004)
12026	DIODE
12027	LINE FILTER (AIR PUMP)
12028	COMPUTER INTERFACE
12029	TRANSDUCER CABLE CONNECTOR
12030	ROTARY TIMER (15 MINUTE)
12031	HEATER DISPLAY WINDOW
12032	HEATING PAD
12033	THERMAL BREAK
12034	CONTROL PANEL (COMPLETE) 83-9 (83-2 $470.00)
12035	VENT SENSOR - 3/8
12035A	VENT SENSOR - 1/4
12036	VENT SENSOR BOARD
12037	COMPUTER INTERFACE CABLE PER FOOT
12038	37 PIN EMI FILTER
12039	CONTROL PANEL (PRE-PROCESS SINK)
12040	POWER CORD WITH HOSP GRADE PLUG
12041	TRANSDUCER/CRYSTAL
12042	RELAY 88 STYLE SYSTEM
12043	24 PIN MAIN HARNESS WITH 24 INCH LEAD
12044	CONTROL PANEL SYSTEM 88
12045	
12046	
12047	
12048	GENERATOR AND DOOR FAN
12049	TWISTLOC PLUG
12050	CIRCUIT BREAKER 81
12051	HEATER CONTROL BOARD (with return)
12052	LOCKING LID SOLENOID
12053	LOCKING LID SWITCH
12054	LOCKING LID POWER SUPPLY

12055	ELECTRODE
12056	TRANSDUCER NOSE PIECE
12057	TRANSDUCER TAIL PIECE
12058	TRANSDUCER EPOXY
12059	BRAZED WASH BASIN
12060	TRANSDUCER WIRE
	ACCESSORY SERIES 13
13000	LAPAROSCOPIC BASKET (POLY)
13001	83-2 INSTRUMENT BASKET
13002	83-2 BASE SCREEN
13003	83-4 BASE SCREEN
13004	81-24 INSTRUMENT BASKET
13005	81-48 INSTRUMENT BASKET
13006	AIR PUMP INTAKE FILTER (1B343B) FELT
13007	ACCESSORY CUP
13008	STAINLESS STEEL FLOAT COVER
13009	80 INSTRUMENT DRUM
13010	80N INSTRUMENT DRUM
13011	STAINLESS STEEL SOLENOID PACKAGE (per chamber)
13012	SCOPE ACCESSORY RACK
13013	DETERGENT PUMP (GALLON BOTTLE)
13014	ACCESSORY CHAMBER BASKET
13015	25 MICRON 20 INCH SEDIMENT FILTER CART. (6/PACK)
13016	(5) MICRON 20" SEDIMENT FILTER CARTRIDGE (6/PACK)
13017	(.1) MICRON 20" BACTERIAL FILTER CARTRIDGE
13018	(20") POLYPRO FILTER HOUSING (INCL. PLUMBING)
13019	SEDIMENT/BACTERIAL FILTER ASSEMBLY (WALL MT)
13020	TERGAL 800 DETERGENT (4 GAL. CASE/TWO CS. MIN)
13021	FILTER ASSEMBLY WALL MOUNT BRACKET
13022	88 SYSTEM INSTRUMENT TRAY
13023	SEDIMENT FILTER ASSEMBLY (WALL MT)
13024	SYSTEM MANUAL (SPECIFY MODEL #)
13025	(WP5) 10" NYLO/STRING FILTER CARTRIDGE (EACH)
13027	PURGING RIGID SCOPE BASKET (2 TRAY)S.S.
13028	88L INSTRUMENT BASKET
13029	SERVICE OR IN-SERVICE MANUAL
13030	RIGID SCOPE BASKET MANIFOLD ADAPTER S.S.
13031	81 BASKET MANIFOLD ADAPTER
13032	MALE LUER ADAPTER (RIGID & 81 BASKET)
13033	LARGE SUCTION ADAPTER (RIGID & 81 BASKET)
13034	SMALL SUCTION ADAPTER (RIGID & 81 BASKET)
13035	LUER LOCK ADAPTER (RIGID & 81 BASKET)
13036	LUER LOCK CAP (RIGID & 81 BASKET)
13037	PURGING MANIFOLD FEMALE ADAPTER (RIGID & 81)
13038	20 INCH FILTER HOUSING O-RING
13039	TRIPLE FILTER ASSEMBLY MOUNTING PLATE
13040	GAUGE FOR FILTER HOUSING
13041	25-5-.01MICRON FILTER PACKAGE (2 SET)
13042	BULKHEAD female or GAUGE ADAPTER male
13043	PERMANENT WALL BRACKET FOR REMOVABLE FILTERS

13044	BACTERIAL FILTRATION UPGRADE KIT
13045	FILTER WRENCH
13046	AUTOCLAVABLE FILL HOSE
13047	5 MICRON SINGLE HOT WATER FILTER ASSEMBLY
13048	5-.1 MICRON SINGLE HOT WATER FILTER ASSEMBLY
13049	25-5-.1 MICRON SINGLE HOT WATER FILTER ASSEMBLY
13050	25 MICRON FILTER ADD ON UPGRADE
13051	81-24 INSTRUMENT BASKET with manifold
13052	81-48 INSTRUMENT BASKET with manifold
13053	CLEAR LID FOR PROCESS CHAMBER
13054	CLEAR LID FOR RESERVOIR CHAMBER
13055	FILTER HOUSING WITH HEAD
13056	20 MICRON AUTO BACK FLUSH FILTER ASSEMBLY
13057	ADAPTER TUBING CLIPS
13058	PVC TOP FOR 83+2
13059	PVC TOP FOR 83+9
13060	CLEAR TOP FOR 83+2
13061	CLEAR TOP FOR 83+9
13062	HINGE COMPLETE
13063	.1 MICRON SEDIMENT BACKFLUSH REPLACEMENT FILTER
13064	20/ABF.1/.1 FILTER hot only
13065	ABF 20/5/.1 FILTER SET hot+cold
13066	1 MICRON 6 PACK
13067	10 MICRON 6 PACK
13068	STAINLESS STEEL SCREEN FOR BACK FLUSH FILTER 20M
13069	83+2 PAINTED DOOR
13070	83+2 REPAINTING OF DOOR
13071	83+9 PAINTED DOOR
13072	83+9 REPAINTING OF DOOR
13073	HEPA AIR FILTER ASSEMBLY
13074	HEPA AIR FILTER CLEAR BOWL
13075	HEPA AIR FILTER ELEMENT
13076	HEPA AIR FILTER ASSEMBLY TOP
13077	.45 MICRON FILTER (6 PACK)
13078	TRANSFORMER (water filter)
13079	COMPRESSION FITTINGS
13080	BACK FLUSH HOUSING
13081	MOTORIZED BALL VALVE
13082	24 VOLT WALL RECEPTACLE
13083	CORIAN BACK PLANE 83-2
13084	EXHAUST ARM AND BRACKET
13085	EXHAUST ARM PUMP
13086	EXHAUST ARM HOSE (per ft)
13087	SCREENED EXHAUST FLANGE
13088	WATER SOFTNER
13089	BOTTLE RACK SHELF
13090	PARKER PUSH FITTINGS - GREY
	MACHINED SERIES 14
14001	PACKING SEAL (80) (80N)
14002	STAINLESS STEEL DRIVE SHAFT (80) (80N)

14003	DELRIN SIDE RAIL 1" (80)
14004	DELRIN SIDE RAIL 3/4" (80)
14005	DRUM SPACER (LARGE) (80)
14006	DRUM SPACER (SMALL) (80)
14007	MOTOR PLATE (80) (80N)
14008	DRIVE MOTOR (80) (80N)
14009	REDUCTION GEAR RATIO (80) (80N)
14010	DRUM GEAR (80) (80N)
14011	DRIVE GEAR (80) (80N)
14012	FLEXIBLE COUPLING (80) (80N)
14013	DELRIN GEAR HOUSING (EXT.) (80) (80N)
14014	DELRIN GEAR HOUSING (INT.) (80) (80N)
14015	BRASS DRUM SUPPORTS (80N)
14016	SERVICE PANEL LATCH ('93 REAR DOOR)
	FLEXIBLE ENDOSCOPES ADAPTERS
	FUJINON SERIES 15
15000	AIR CHANNEL ADAPTER
15001	WATER CHANNEL ADAPTER WITH FILTER # 16030
15002	SUCTION CHANNEL ADAPTER
15003	AIR/WATER VALVE PLUG (SERIES 2000) (004)
15004	VALVE COVER FOR FUJI STYLE VIDEO
15004DC	VALVE COVER FOR FUJI STYLE VIDEO DRYING CAB
15005	SUCTION VALVE PLUG (006)
15006	BIOPSY CHANNEL ADAPTER (SERIES 2000)
15007	AUXILIARY CHANNEL LURE LOCK (007)
15008	BRONCHOSCOPE SUCTION PORT
15009	SERIES 7 LURE LOCK PLUGS
15010	PLASTIC LURE LOCK END (ONLY)
15011	LENSES ADAPTER
15012	CO2 VALVE PLUG
15013	DRYING ATTACHMENT (UPPER GI SCOPES) SET
15014	DRYING ATTACHMENT (LOWER GI SCOPES) SET
	OLYMPUS SERIES 16
16000	AIR CHANNEL ADAPTER
16001	WATER CHANNEL ADAPTER (009) WITH FILTER # 16030
16002	SUCTION CHANNEL ADAPTER
16002-1	SUCTION CHANNEL ADAPTER SMALL GREEN /FITTING
16003	(OES) CONTROL VALVE DOOR CLAMP
16004	WATER CHANNEL ADAPTER (VIDEO) (009)
16005	(OES) (ERCP) CONTROL VALVE DOOR CLAMP
16005DC	(OES) (ERCP) CONTROL VALVE DOOR CLAMP DRYING CAB
16006	(OES) BIOPSY CHANNEL ADAPTER
16007	SUCTION CHANNEL ADAPTER (SMALL)
16008	ERCP/WATER JET CHANNEL CLEANING ADAPTER
16008hp	ERCP/WATER JET CHANNEL CLEANING ADAPTER
16009	CO2 ADAPTER (100 SERIES VIDEO - LOWER)

16010	ULTRASOUND SCOPE VALVE COVER
16011	CONTROL VALVE ADAPTER (PRE-OES) (005)
16012	SMALL SUCTION CHANNEL ADAPTER
16013	CONTROL VALVE ADAPTER (PRE-OES) (007)
16014	AIR/WATER ADAPTER OSF
16015	BIOPSY ADAPTER CLIP (OLYMPUS/NEW FUJI)
16016	OPEN
16017	OPEN
16018	BRONCHOSCOPE SUCTION VALVE HOUSING ADAPTER BF 160
16019	BRONCHOSCOPE ADAPTER (OLYMPUS #52465)
16019B	BRONCHOSCOPE ADAPTER (OLYMPUS #52465)
16020	SUCTION BUTTON CLEANING ADAPTER
16021	BIOPSY ADAPTER (OLYMPUS BF #52465)
16022	SIG OSF2 SUCTION PLUG (010)
16023	SIG OSF2 AIR/WATER PLUG (011)
16024	OSF 2 DRYING CABINET ADAPTER (SUCTION/AIR WATER)
16025	SUCTION ADAPTER PLASTIC END
16026	VALVE COVER FOR 140 STYLE VIDEO
16026DC	VALVE COVER FOR 140/160/180 STYLE VIDEO DRYING CAB
16027	
16028	AIR FEED ADAPTER 140 SERIES
16029	WATER CHANNEL ADAPTER 140 SERIES
16030	WATER or AIR FILTER INSERT for Olympus,Fuji and Pentax
16031	OLYMPUS 140 SERIES ADAPTER SET (16002,16006,16008 not inc.)
16032	OLYMPUS 140 SERIES ADAPTER SET (16002,16006,16008 includ)
16033	
16034	
16035	COMPLETE ADAPTER TUBING WITH FILTER UPDATE
16036	WATER CHANNEL ADAPTER 180/160/140 SERIES
	PENTAX SERIES 17
17000	PENTAX STYLE VALVE COVER
17000DC	PENTAX STYLE VALVE COVER
17001	WATER CHANNEL ADAPTER WITH FILTER # 16030
17002	SUCTION CHANNEL ADAPTER
17003	AIR/WATER CHANNEL ADAPTER (OF-B41) (006)
17004	WATER CHANNEL ADAPTER (0F-G8) (010)
17005	SUCTION CHANNEL PLUG (OF-B36) (007)
17006	SUCTION CHANNEL INSERT (OF-34A) (010)
17007	SUCTION CHANNEL INSERT (OF-34) (009)
17008	DRYING CABINET UPPER SCOPE SET
17009	DRYING CABINET LOWER SCOPE SET
17010	DRYING CABINET UPPER 2900 SERIES
17011	DRYING CABINET LOWER 3800 SERIES
17012	DRYING CABINET SIG FS34P2
17013	DRYING CABINET UP/LO 2930-3830 SET
17014	AUXILLARY CHANNEL ADAPTER FOR 3840 SERIES

17015	ULTRASOUND/DOUBLE BIOPSY SELECTOR PLUG
17016	AUXILLARY CHANNEL ADAPTER
	ADAPTER FITTINGS SERIES 18
18009	FOAM PADS (16003 OR 16005) (6 PADS/PACK)
18010	8 PORT ROTATING MANIFOLD HEAD
18011	VALVE BODY (MQC-V3)
18012	10/32 TO 1/8" HOSE BARB (11752-3)
18013	1/8" HOSE CONNECTOR (MQC-F)
18014	COUPLING (1/2" -24 TO 1/8" MIP)
18015	HOSE BARB FITTINGS (PLASTIC)
18016	KWIK CONNECT INSERT (294PM06)
18017	T COUPLING (NYLON)
18018	ALCOHOL PURGE ADAPTER(OLD STYLE WHITE)
18019	MANIFOLD MEDIUM TUBING (PRICE PER FT)
18020	1/8" VINYL TUBING (CLEAR & COLORS) (PRICE/FT)
18021	1/8" SILICON TUBING (PRICE/FT) (CLEAR & COLORS)
18022	FEMALE BULKHEAD CONNECTOR (DELRIN PMCD-10-02)
18023	MALE BULKHEAD ADAPTER (DELRIN PMCD-22-02)
18024	1/2" SILICON TUBING (PRICE PER FT)
18025	BUBBLE TUBING
18026	90 TYPE MALE BULKHEAD ADAPTER
18027	BRAIDED SILICON TUBING (PRICE/FT)
18028	HIGH PRESSURE SMALL TUBING (PRICE PER FT)
18029	AIRLINE TUBING (HARD WHITE) PER FT
18030	ALCOHOL PURGE ADAPTER(NEW STYLE GREY)
18031	ERBE PURGING ADAPTER
18032	RESTRICTER
18033	TURBO-TUBE
18034	PENTAX VALVE BLOCK #1
18035	PENTAX VALVE BLOCK #2
18036	PENTAX VALVE BLOCK #3
18037	PENTAX VALVE BLOCK #4
18038	OLYMPUS VALVE BLOCK
18039	FUJI BLOCK 200 VALVE BLOCK
18040	FUJI BLOCK 400 VALVE BLOCK
18041	TURBO-TUBE REPLACEMENT SCREEN SET (top/botom)
18042	TURBO-TUBE CLIP HOLDER
18043	FLEXIBLE PLUMBING TUBING PER FT.
18044	TRANSFER CAP - J+J SERIES BOTTLES (COMPLETE KIT)
18045	J+J TYPE TRANSFER CAP
18046	BOTTLE ADAPTER/TRANSFER CAP USED WITH 18045
18047	TANSFER CAP TOP ADAPTER
18048	TRANSFER CAP SIDE ADAPTER
18049	TRANSFER CAP SYSTEM BULKHEAD
18050	TRANSFER CAP TOP BULKHEAD
18051	TRANSFER CAP SIDE BULKHEAD
	INSTRUMENT LEAK TESTING SERIES 19

19000	LEAK TESTER (CHOICE OF ONE ADAPTER)
19001	OLYMPUS ADAPTER FOR LEAK TESTER
19002	FUJINON ADAPTER FOR LEAK TESTER
19003	QUICK DISCONNECT
19004	PENTAX ADAPTER FOR LEAK TESTER
19005	O-RING–PENTAX OR OLYMPUS (5-PACK)
	STAINLESS ADAPTER FITTINGS SERIES 19
19012	10/32 TO 1/8" HOSE BARB (STAINLESS)
19013	1/8" HOSE CONNECTOR (STAINLESS)
19014	COUPLING (1/2" -24 TO 1/8" MIP)
19015	6 PORT ROTATING MANIFOLD (STAINLESS)
19016	KWIK CONNECT INSERT (STAINLESS)
19017	T COUPLING (STAINLESS)
19018	ACCESSORY CHAMBER ADAPTER
19019	3/8X1/8X0.109 ORIFICE
19020	3/8X1/4/0.250 ORIFICE
19021	3/8X1/8.125 ORFICE
19022	1/4X1/8.078 ORIFICE
19023	1/4X1/8.093 ORIFICE
	DRYING CABINET AND ACCESSORIES SERIES 20
20001	DESICCANT BAGS (SIX/CASE) (MIN ORDER 1 CASE)
20002	REPLACEMENT: SCOPE SUPPORTING BRACKET
20003	HUMIDITY INDICATOR CARDS (3/PACK)
20004	HEPA AIR FILTER ASS'Y (CASING & CARTRIDGE)
20005	SINGLE SCOPE BRACKET
20006	REPLACEMENT AIR PUMP
20007	PROGRAMMABLE AIR PUMP TIMER
20008	DUAL PORT MALE BULKHEAD ADAPTER
20009	DUAL PORT FEMALE BULKHEAD ADAPTER
20010	SCREW ON AIR FILTER
20011	TWIN SCOPE BRACKET
20012	HANDLE/LOCK
	SYSTEM 93 PARTS AND ACCESSORIES SERIES 21
21000	FILTER FRAME FOR BACK OF SYSTEM
21001	SYSTEM FUME FILTER CARTRIDGE
21002	FLOOR VACUUM HOUSING - SMALL
21003	FUME FILTER FOR SMALL FLOOR VAC
21004	FLOOR VACUUM HOUSING - LARGE
21005	FUME FILTER FOR LARGE FLOOR VAC
21006	VACUUM PUMP
21007	CORRUGATED TUBING (PRICE/FOOT)
21008	SEVEN DAY PROGRAMMABLE CLOCK
21009	PVC and ADJUSTMENT VALVE FITTINGS
21010	RETRO-FIT MANIFOLD
21011	BACK PACK BRACKET
21012	FLOOR VACUUM - SMALL
21013	FLOOR VACUUM - LARGE

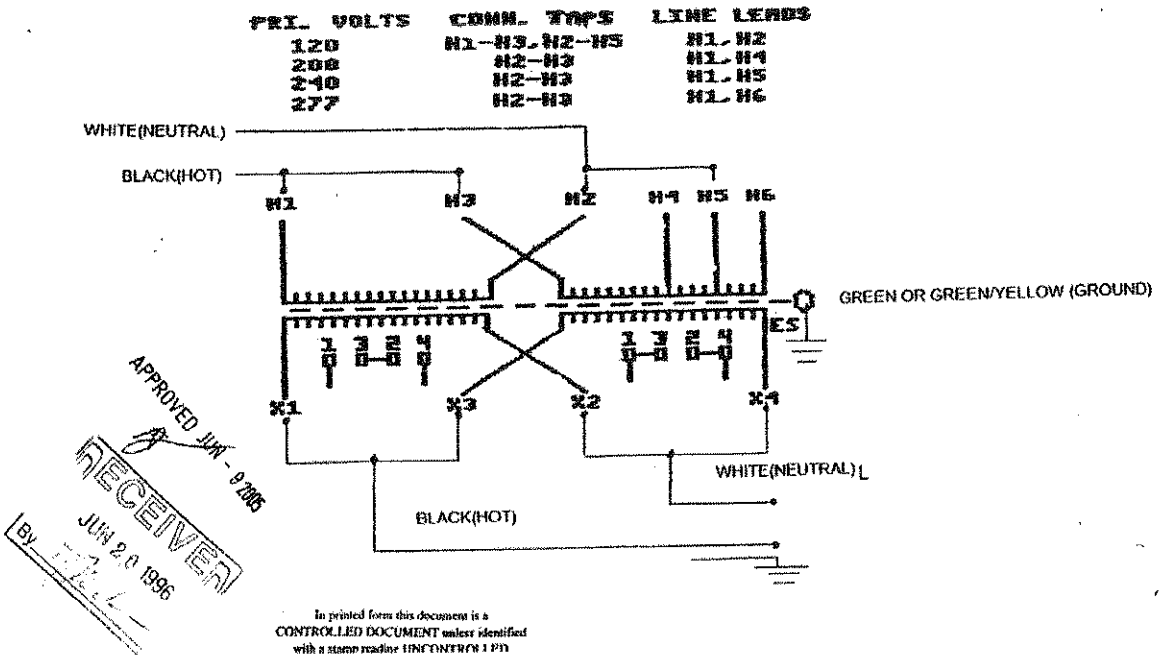
21014	FLOOR VACUUM MOTOR - SMALL
21014-1	FLOOR VACUUM MOTOR - LARGE
21015	FLOOR VACUUM SWITCH
21016	BLUE FILTER HOUSING 20 INCH
21017	CHARCOAL REPLACMENT FILTER 20 INCH
21018	FUME EXTRACTION WALL MOUNTING PLATE W/HOSE BARB
21019	MUFFLER VENT PUMP
	COMPUTER PARTS SERIES 26
26001	open
26002	open
26003	open
26004	KEYBOARD COVER LARGE/SMALL
26005	COMPUTER CASE
26006	250 WATT POWER SUPPLY (UL, CSA, TUV APPR.)
26007	open
26008	open
26009	RELAY DRIVER CARD
26010	HARD DRIVE
26011	3.5" MINI FLOPPY DRIVE
26012	6' PRINTER CABLE
26013	25' PRINTER CABLE
26014	50' PRINTER CABLE
26015	37 PIN I/O RIBBON CABLE (3 FOOT)
26016	RELAY DRIVER CABLE (20 FOOT)
26017	RELAY DRIVE CABLE (SPECIAL ORDER LENGTH)PER FOOT
26018	RELAY INTERFACE BOX
26019	RAM
26020	MUX BOARD
26021	A/D BOARD
26022	MOTHER BOARD
26023	SURGE STRIP
26024	PROGRAMMED SECURITY KEY
26025	BACK PLANE
26026	CU4 PROGRAM REPLACEMENT DISK
26027	CU4 PROGRAM UPGRADE DISK
26028	COMPUTER STAND (WHITE STYLE)
26029	L.C.D. MONITOR
26030	SMALL PRINTER
26031	SMALL KEYBOARD
26032	POWER SUPPLY FOR MONITOR
26033	POWER SUPPLY FOR PRINTER
26034	SMALL PRINTER RIBBON
26035	PRINTER PAPER ROLL FOR SMALL PRINTER
26036	PENTHIUM MOTHER BOARD
26037	MONITOR COVER (LARGE OR SMALL
26038	Y2K UPGRADE
26039	L.C.D. MONITOR rebuilt if in stock
26040	SPINDLE - PRINTER ROLL

Wiring Schematics

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 025
PREPARED BY: Signature on file	DATE:	TITLE: ELECTROSTATIC ISOLATION TRANSFORMER WIRING SCHEMATIC		
APPROVED BY: Signature on file	DATE:			

Manufacturer HEVI-DUTY
Catalogue/Part # HS12F1.5AS-5

Electrostatic Isolation Transformer



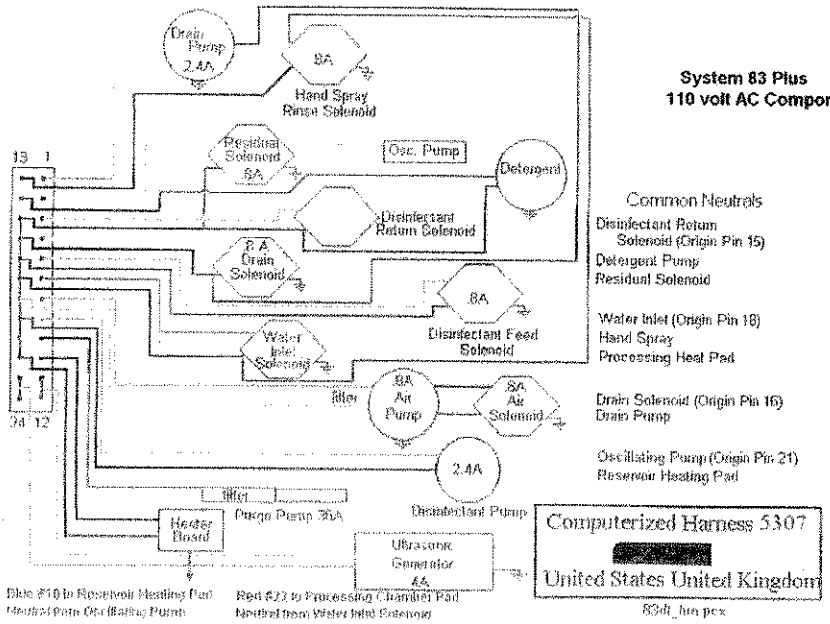
APPROVED JUN - 9 1996
RECEIVED
JUN 20 1996
By

In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 022
PREPARED BY: Signature on file	DATE:	TITLE: AC HARNESS SYSTEM 83 DT SCHEMATIC		
APPROVED BY: Signature on file	DATE:			



APPROVED JAN 14 2008

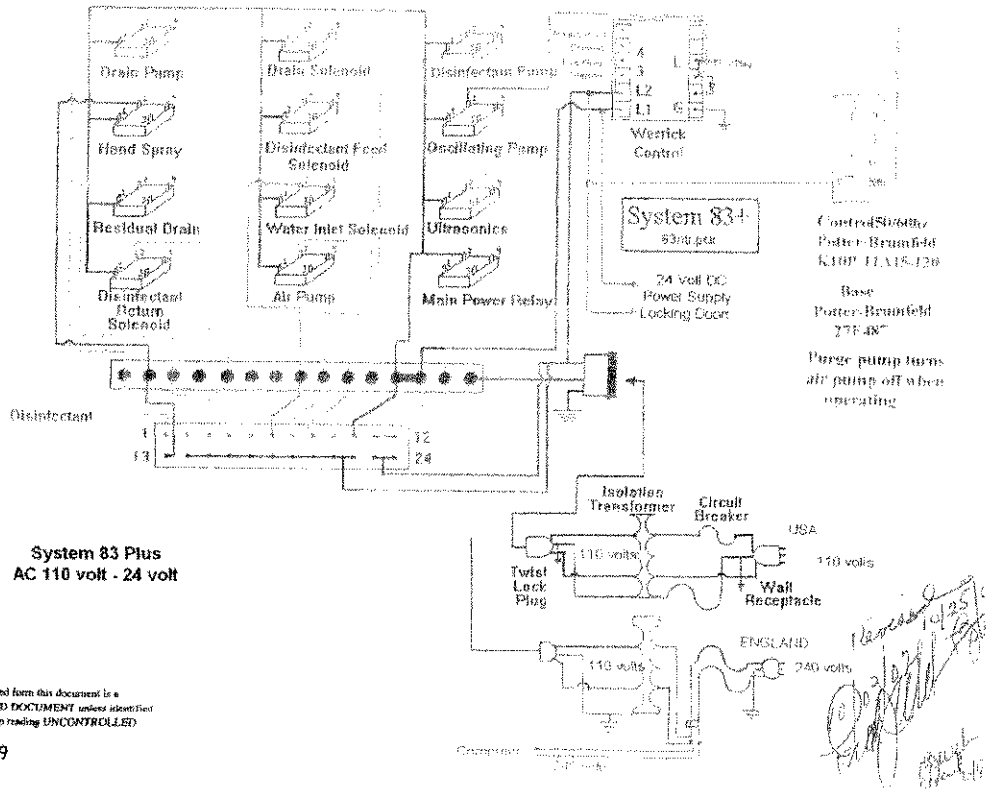
In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-022

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 019
PREPARED BY: Signature on File	DATE:	TITLE: COMPUTER INTERFACE (AC INPUT–OUTPUT) SYSTEM 83 PLUS		
APPROVED BY: Signature on File	DATE:			



In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

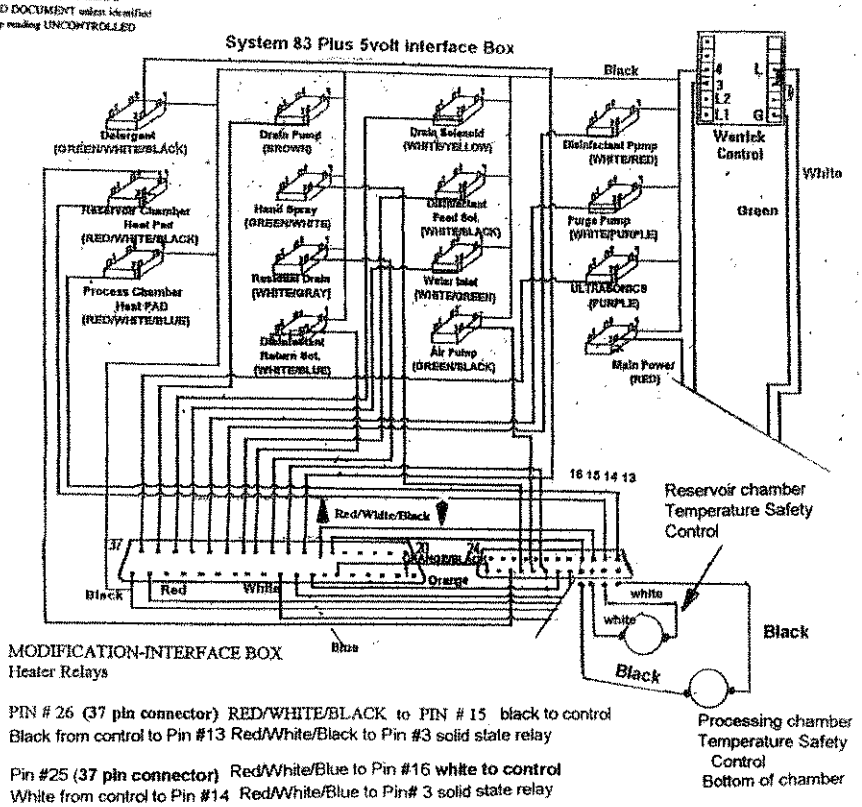
WS-019

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 017
PREPARED BY: Signature on file	DATE:	TITLE: COMPUTER INTERFACE (DC INPUT–OUTPUT) SYSTEM 83 PLUS DT		
APPROVED BY: Signature on file	DATE:			

In printed from this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED



MODIFICATION-INTERFACE BOX
Heater Relays

PIN # 26 **(37 pin connector)** RED/WHITE/BLACK to PIN # 15 black to control
Black from control to Pin #13 Red/White/Black to Pin #3 solid state relay

Pin #25 **(37 pin connector)** Red/White/Blue to Pin #16 **white to control**
White from control to Pin #14 Red/White/Blue to Pin# 3 solid state relay

WS-017

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 015
PREPARED BY: Signature on file	DATE:	TITLE: AC HARNESS SYSTEM 83		
APPROVED BY: Signature on file	DATE:			

In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

Solid State Relay/AC Component
110 Volt

COMPUTER OPERATED SYSTEM - WIRE HARNESS 83C

PIN #	COLOR	COMPONENT
7	BROWN(hot)	Drain Pump - NEUTRAL DRAIN SOLENOID
13	BLACK(hot)	Bead Spray - NEUTRAL WATER INLET SOLENOID
2	RED(hot)	Rest&sol Drain - NEUTRAL DISINFECTANT RETURN SOLENOID
14	WHITE(hot)	DETERGENT - NEUTRAL WATER INLET SOLENOID
3	PUR(hot)	Disinfectant Return Solenoid
15	BLACK(neutral)	Disinfectant Return Solenoid
4	ORANGE(hot)	Drain Solenoid
16	BLACK(neutral)	Drain Solenoid
5	YELLOW(hot)	Disinfectant Feed Solenoid
17	BLUE(neutral)	Disinfectant Feed Solenoid
6	BLUE(hot)	Rate, (in)et Solenoid
18	BLACK(neutral)	Water Inlet Solenoid
7	BROWN(hot)	AIR PUMP/Air Solenoid
19	RED(neutral)	Air Pump/Air Solenoid
8	ORANGE(hot)	Disinfectant Pump
20	BLACK(neutral)	Disinfectant Pump
9	WHITE(hot)	Purge/Oscillating Pump
21	BLACK(neutral)	Purge/Oscillating Pump
10	BLUE(hot)	Heater Pad
22	RED(neutral)	Heater Pad
11,12	RED(hot)	Ultrasonics
23,24	GREEN(neutral)	Ultrasonics

* Extra pair Red/yellow

WS-015

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 013
PREPARED BY: Signature on file	DATE:	TITLE: COMPUTERIZED INTERFACE 37 PIN CABLE SYSTEM 83 PLUS		
APPROVED BY: Signature on file	DATE:			

Computer Interface Cable
5 Volt DC
SYSTEM 83 PLUS

Common SSR Relays (BLACK)	GND	19	37	Port A0 (PURPLE)	Ultrasonics
Main SSR Relay (RED)	+ 5 Volt	18	36	Port A1 (BROWN)	Drain Pump
(not used)	GND	17	35	Port A2 (WHITE/YELLOW)	Drain Solenoid
(not used)	+ 12 Volt	16	34	Port A3 (WHITE/GREEN)	Water Inlet Solenoid
(not used)	GND	15	33	Port A4 (WHITE/PURPLE)	Oscillating Pump
(not used)	- 12 Volt	14	32	Port A5 (WHITE/RED)	Disinfectant Pump
(not used)	GND	13	31	Port A6 (WHITE/BLACK)	Disinfectant Feed Solenoid
(not used)	- 5 Volt	12	30	Port A7 (WHITE/BLUE)	Disinfectant Return Solenoid
(not used)	GND	11	29	Port C0 (WHITE/GRAY)	Residual Solenoid and Pump
Warrick Control (WHITE)	Port B0	10	28	Port C1 (WHITE/ORANGE)	Air Pump
Operating Float (BLUE)	Port B1	9	27	Port C2 (GREEN/WHITE/BLACK)	Lubrication/Detergent
Safety Float (ORANGE)	Port B2	8	26	Port C3 (RED/WHITE/BLACK)	Temperature Reservoir
Lubrication (GREEN)	Port B3	7	25	Port C4 (RED/WHITE/BLUE)	Temperature Process Chamber
Water Channel (ORANGE/BLACK)	Port B4	6	24	Port C5 (BLACK/WHITE/YELLOW)	Drain Spray Solenoid
(not used)	Port B5	5	23	Port C6 (BLACK/ORANGE/WHITE)	Detergent/Lubrication
(not used)	Port B6	4	22	Port C7 (BLACK/BLUE/WHITE)	Enzyme Injection
(not used)	Port B7	3	21	GND	-- PC Bus (not used)
(not used)	IR Enable	2	20	+ 5 Volt	(not used)
(not used)	IR Input	1			

VIEW FROM REAR OF PIN

Reproduced 6/18/00
Reviewed 3/17/99
RECEIVED JUN 20 1996 BY 12/5/96

A printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

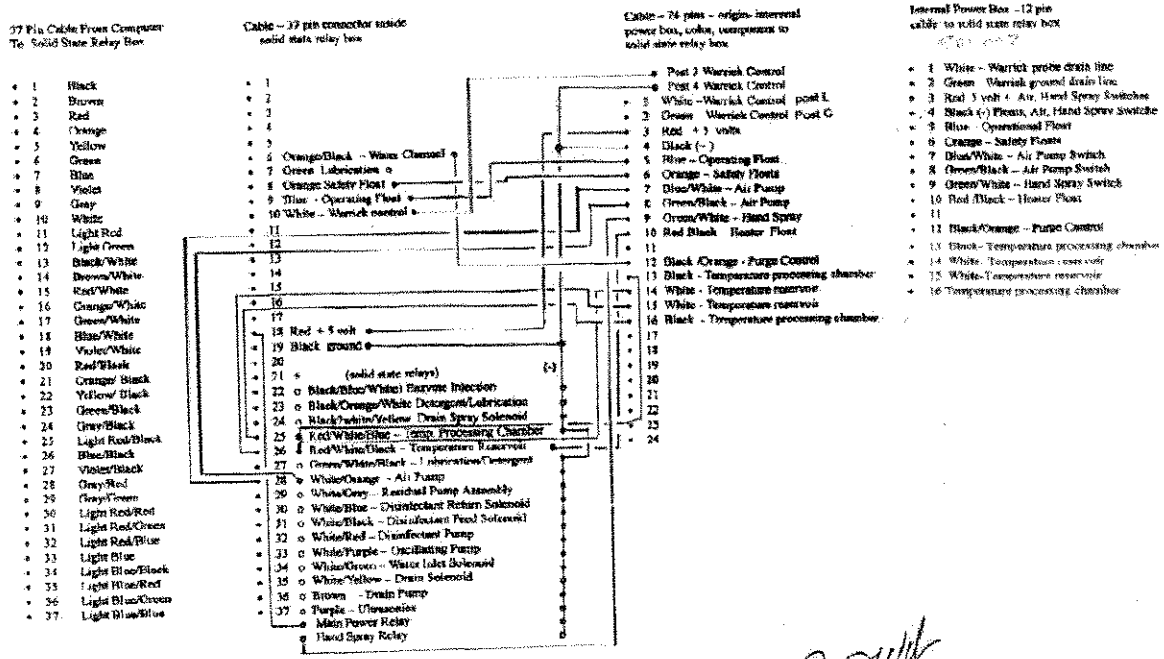
WS-013

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 010
PREPARED BY: Signature on File	DATE:	TITLE: MASTER SCHEMATIC SYSTEM 83 PLUS		
APPROVED BY: Signature on File	DATE:			

Master Schematic System 83 Plus



12/25/03

In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-010

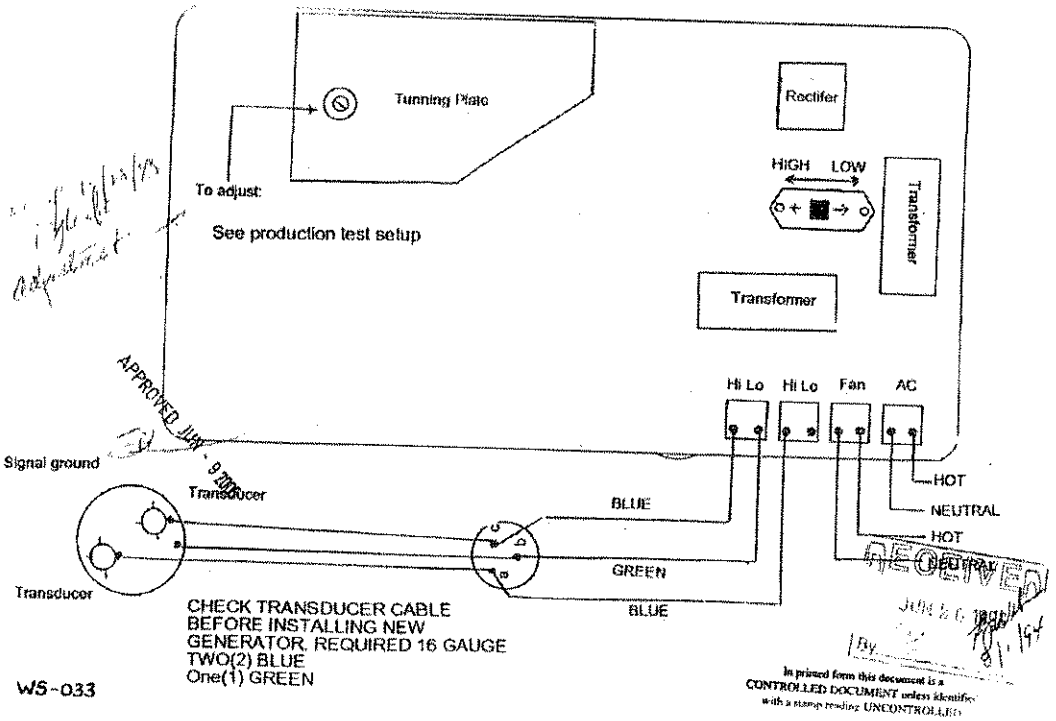
REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 033
PREPARED BY: Signature on file	DATE:	TITLE: SYSTEM 83 ULTRASONIC GENERATOR DRAWING		
APPROVED BY: Signature on file	DATE:			

Property Of
Custom Ultrasonics Inc
144-146 Railroad Drive
Ivyland, PA 18974

ULTRASONIC GENERATOR
BOARD 06194



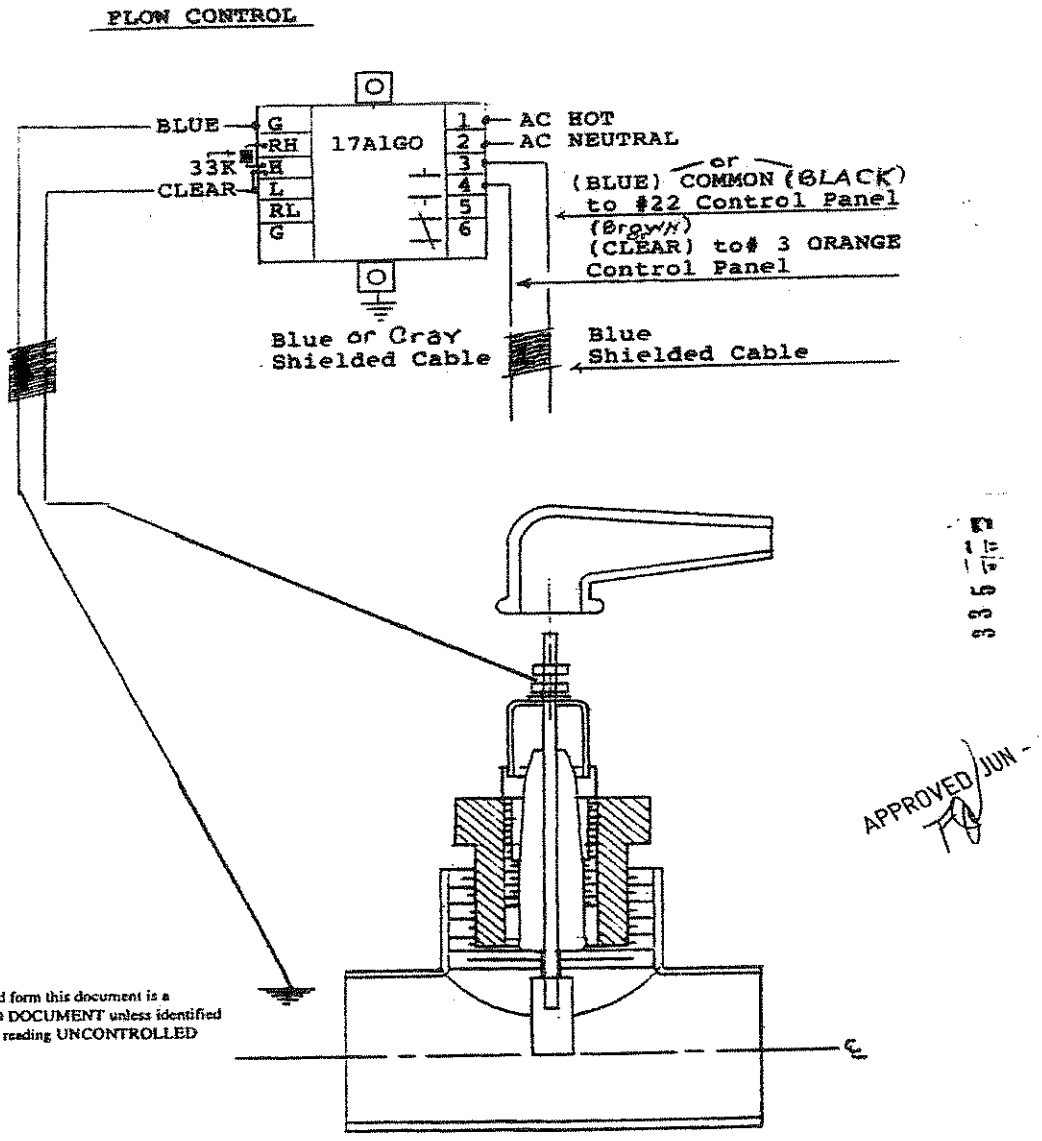
RECEIVED
In printed form this document is a
CONTROLLED DOCUMENT unless identified
with a stamp reading UNCONTROLLED

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 023
PREPARED BY: Signature on file	DATE:	TITLE: SYSTEM 83 PLUS FLOW CONTROL, PROBE AND BOOT		
APPROVED BY: Signature on file	DATE:			

System 83 Plus
Warrick Control Probe and Boot



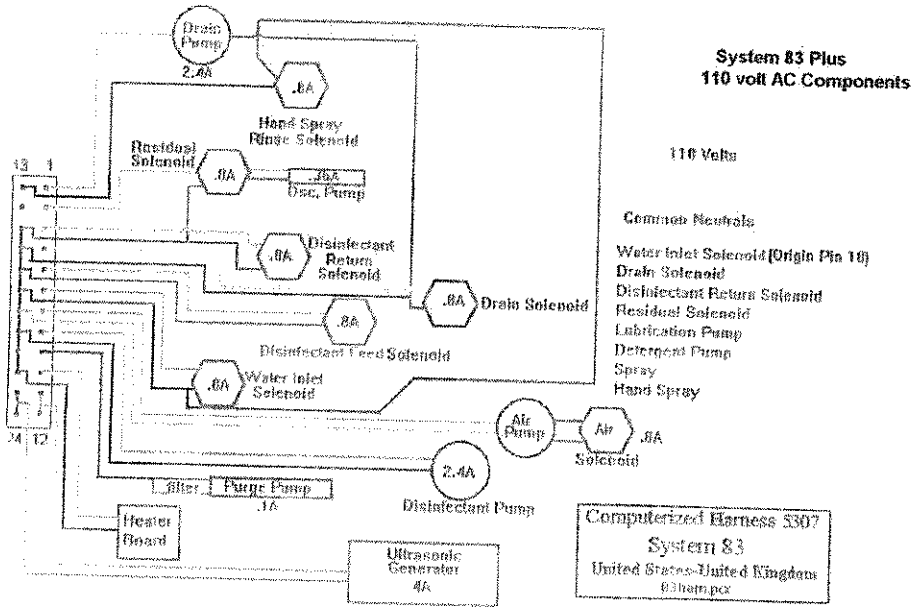
In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-023

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 021
PREPARED BY: Signature on file	DATE:	TITLE: AC HARNESS SYSTEM 83 SCHEMATIC		
APPROVED BY: Signature on file	DATE:			



In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

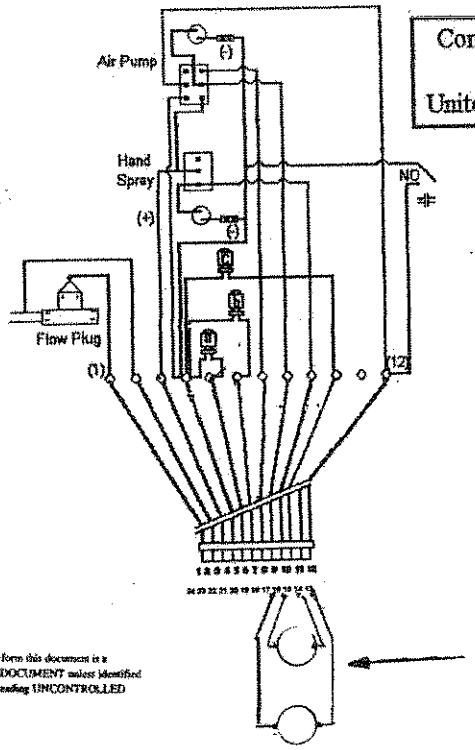
APPROVED JUN 1 6 2006

WS-021

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 018
PREPARED BY: Signature on file	DATE:	TITLE: SYSTEM 83 PLUS DT 24 PIN LOW VOLTAGE INPUT SCHEMATIC		
APPROVED BY: Signature on file	DATE:			



Control Panel- System 83+dt
24 Pin Cable 5 vdc
United States-United Kingdom

24 PIN CABLE FROM 12 POST STRIP CONNECTOR TO COMPUTER INTERFACE BOX

Post #1 (WHITE) to Warrick Flow Plug in Drain Line
Post #2 (GRREN) to Drain Line Ground
Post #3 (RED) (+) Positive
Post #4 (BLACK) (-) Negative
Post #5 (BLUE) Operating Float --Processing Chamber
Post #6 (ORANGE) Safety Float -- Processing Chamber Reservoir Chamber
Post #7 (BLUE/WHITE) Air Pump Switch
Post #8 (GREEN BLACK) Air Pump Switch
Post #9 (GREEN/WHITE) Hand Spray Switch
Post #10 (RED/BLACK) Heater Control Float
Post #11 not used
Post #12 (BLACK/ORANGE) Purge Control

24 pin connector-Temperature Control
Pin #13 Black - Processing Chamber
Pin #16 Black - Processing Chamber
Pin # 14 White - Disinfectant Reservoir
Pin # 15 White - Disinfectant Reservoir

In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-018

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 016
PREPARED BY: Signature on file	DATE:	TITLE: AC HARNESS SYSTEM 83 COLOR CODE		
APPROVED BY: Signature on file	DATE:			

CUSTOM ULTRASONICS INC.

Decontamination Systems for the Health Care Industry

Solid State Relay/AC Component
110 Volt

24 Pin - AC wire harness - wire color code
SYSTEM 83 Plus and System 83Plus-DT

```
   1...Brown.......Drain pump(neutral from Drain Solenoid)
13.....Black.......Hand Spray(neutral from water inlet Solenoid)
   2...Red.........Residual Drain(neutral Disinfectant Return Sol.)
14.....White.......Detergent Pump(neutral Drain Solenoid..)
   3...Red.........Disinfectant Return Solenoid
15.....Black.......Disinfectant Return Solenoid(neutral)
   4...Orange......Drain Solenoid
16.....Black.......Drain Solenoid(neutral)
   5...Yellow......Disinfectant Feed Solenoid
17.....Black.......Disinfectant Feed Solenoid(neutral)
   6...Blue........Water Inlet Solenoid
18.....Black.......Water Inlet Solenoid(neutral)
   7...Brown.......Air Pump
19.....Red.........Air Pump(neutral)
   8...Green.......Disinfectant Feed Pump
20.....Black.......Disinfectant Feed Pump(neutral
   9...White.......Oscillating Pump
21.....Black.......Oscillating Pump(neutral)
  10..Blue........Reservoir Heat Pad(neutral Oscillating Pump)
22.....Red.........Processing Chamber Heat Pad(neutral Water Inlet Sol.)
  11..Red.........Ultrasonics
23.....Green.......Ultrasonics(neutral)
  12..Red.........Ultrasonics
24.....Green.......Ultrasonics(neutral
```

APPROVED JUN 14 2006

JUN 20 1996

P.O. Box 850 Buckingham, PA 18912
Phone 215-364-1477 Fax 215-364-7674

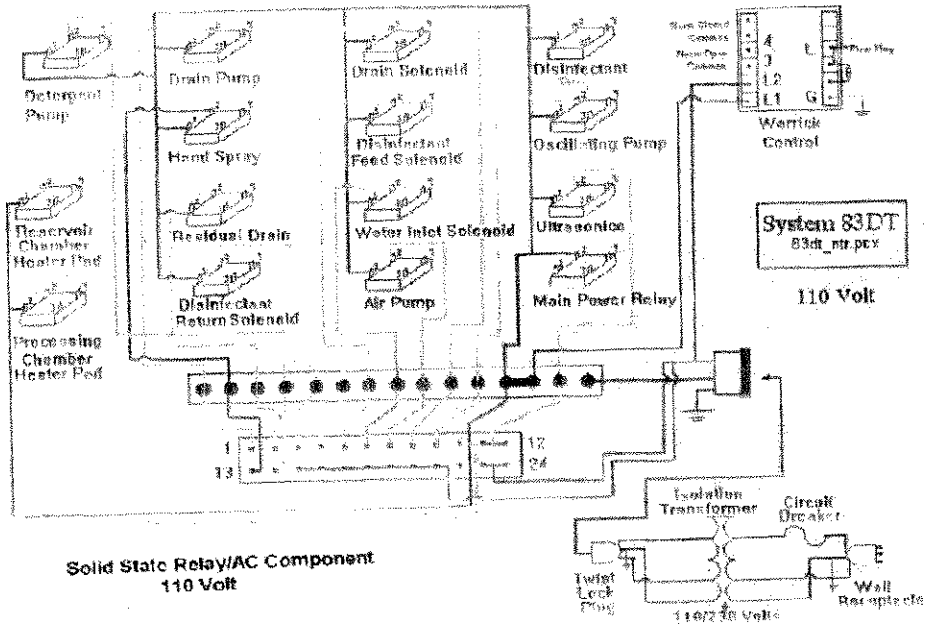
In printed form this document is a CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-016

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 014
PREPARED BY: Signature on file	DATE:	TITLE: COMPUTER INTERFACE (AC INPUT–OUTPUT) SYSTEM 83 + DT		
APPROVED BY: Signature on file	DATE:			



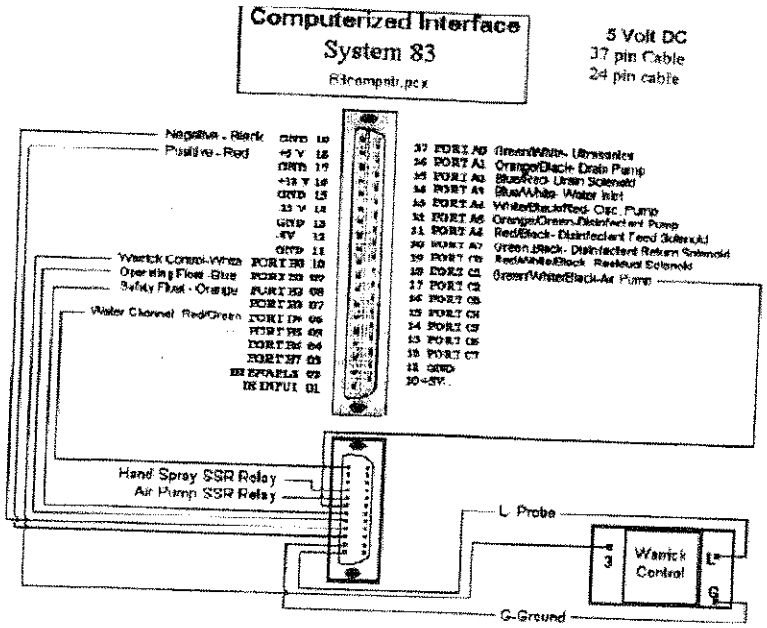
is printed from this document it is CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS - 014

REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

CUSTOM ULTRASONICS,		SHEET 1 OF 1	REVISION A	DOCUMENT NUMBER WS 012
PREPARED BY: Signature on file	DATE:	TITLE: COMPUTER INTERFACE (DC INPUT-OUTPUT) SYSTEM 83 PLUS		
APPROVED BY: Signature on file	DATE:			



APPROVED JUN 1 8 2008

When printed from this document it is CONTROLLED DOCUMENT unless identified with a stamp reading UNCONTROLLED

WS-012

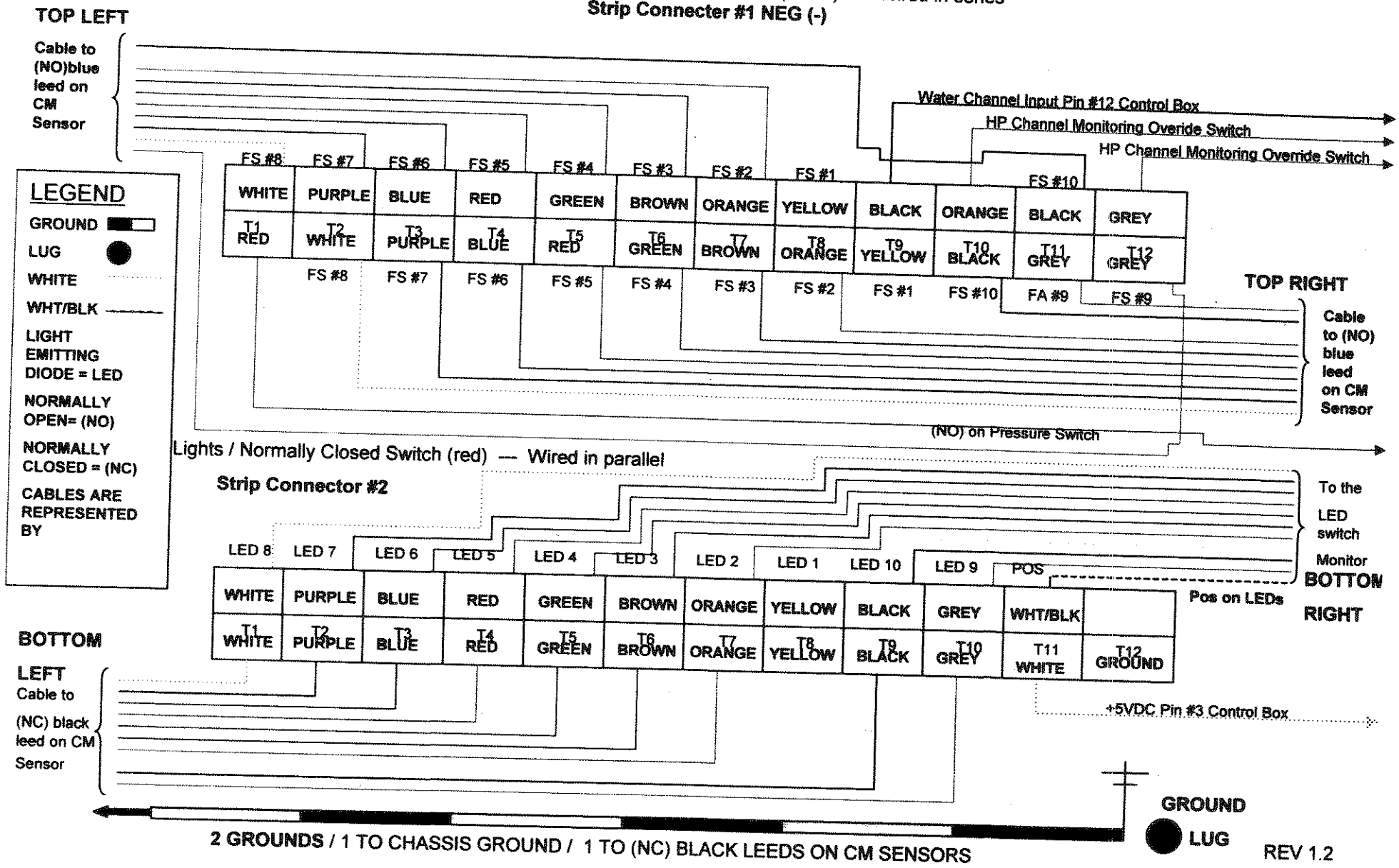
REVISION	DCO NUMBER	DESCRIPTION OF CHANGE	ORIG.	QA RELEASE	DATE
A	N/A	New Document	X	Signature on File	3/8/07

Custom Ultrasonics, Inc. documentation is considered PROPRIETARY and is made available for business operations and review by employees of the Company and regulatory agencies only. Distribution to third parties without prior permission is prohibited.

Wiring Diagram for Sys 83TM Flow Switches (Bank of 10)

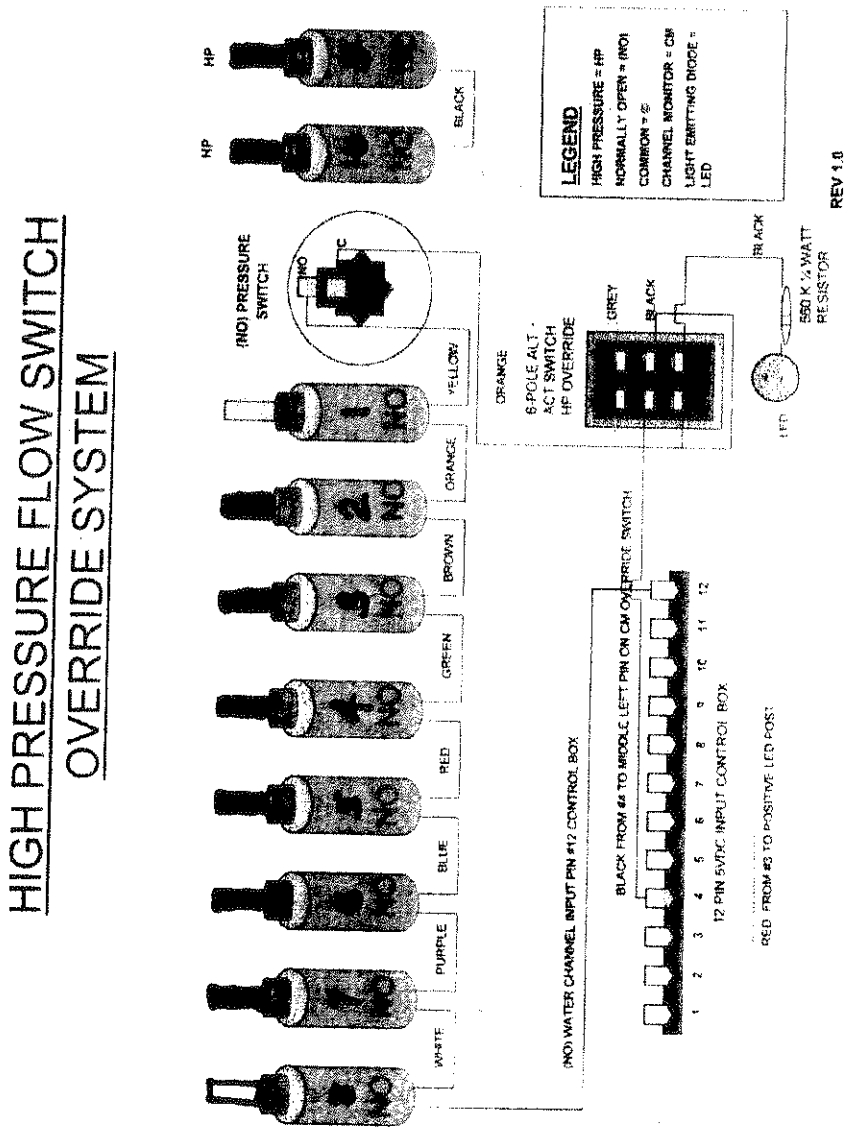
Water Channel / Normally Open Switch (Black) — Wired in series

Strip Connecter #1 NEG (-)


TOP LEFT
Cable to (NO)blue leed on CM Sensor
LEGEND
GROUND
LUG
WHITE
WHT/BLK
LIGHT EMITTING DIODE = LED
NORMALLY OPEN= (NO)
NORMALLY CLOSED = (NC)
CABLES ARE REPRESENTED BY
FS #8 FS #7 FS #6 FS #5 FS #4 FS #3 FS #2 FS #1 FS #10
WHITE PURPLE BLUE RED GREEN BROWN ORANGE YELLOW BLACK ORANGE BLACK GREY
T1 RED T2 WHITE T3 PURPLE T4 BLUE T5 RED T6 GREEN T7 BROWN T8 ORANGE T9 YELLOW T10 BLACK T11 GREY T12 GREY
FS #8 FS #7 FS #6 FS #5 FS #4 FS #3 FS #2 FS #1 FS #10 FA #9 FS #9
Water Channel Input Pin #12 Control Box
HP Channel Monitoring Overide Switch
HP Channel Monitoring Override Switch
TOP RIGHT
Cable to (NO) blue leed on CM Sensor
(NO) on Pressure Switch
Lights / Normally Closed Switch (red) — Wired in parallel
Strip Connector #2
LED 8 LED 7 LED 6 LED 5 LED 4 LED 3 LED 2 LED 1 LED 10 LED 9 POS
WHITE PURPLE BLUE RED GREEN BROWN ORANGE YELLOW BLACK GREY WHT/BLK
T1 WHITE T2 PURPLE T3 BLUE T4 RED T5 GREEN T6 BROWN T7 ORANGE T8 YELLOW T9 BLACK T10 GREY T11 WHITE T12 GROUND
To the LED switch Monitor
Pos on LEDs
BOTTOM RIGHT
BOTTOM LEFT
Cable to (NC) black leed on CM Sensor
+5VDC Pin #3 Control Box
GROUND
LUG
2 GROUNDS / 1 TO CHASSIS GROUND / 1 TO (NC) BLACK LEEDS ON CM SENSORS
REV 1.2

MANUFACTURING PROCESS INSTRUCTIONS

INSTRUCTIONS:



PROCEDURE TO RESET THE DETERGENT TIMER:

You need to know how much of your detergent you would like to have in each wash cycle.

In the metal box below the sink is a digital timer. The timer has a set of binary switches as noted on the bottom of the page.

Use the center bank of switches as shown in the diagram. [The left and right banks are blanked out and are for different model switches.]

The number next to each switch is the number of seconds that the pump will stay on -- and they are additive.

Approximately 0.14 ounces are delivered per second of pump operation. [1 oz / 7sec].

The volume in the sink (to the bottom of the sensor) is ~6 GAL.

Set-up Examples:

If your detergent says 1 oz per gallon, the switches need to be set to add up to 42 sec. [7 sec/oz X 6 oz]

That means only switches 2, 8, and 32 should be in the ON position. [Adding 2+8+32=42]

If your detergent says 1/2 oz per gallon, the switches need to be set to add up to 15 sec. [7 sec/oz X 3 oz]

That means only switches 1, 4, and 16 should be in the ON position. [Adding 1+4+16=21]